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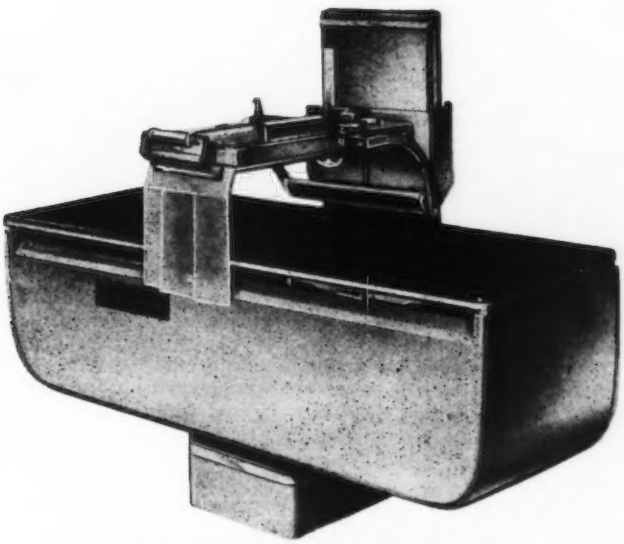

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VANCOUVER MAINLAND BRANCH

The first meeting of the Fall and Winter season was held at the North Vancouver General Hospital on Thursday, September 12th. Miss Fisher was in the chair and soon completed the business of committee reports and other relative subjects. Miss Mary McMillan gave a very interesting and comprehensive report on the Washington meeting. She covered all the business activities and explained the various items in detail for the benefit of the members. Twenty-five members attended this first meeting and it is hoped that this figure will be improved upon as the year progresses. Mr. Gerrie Larsen introduced Dr. McDonald, a North Vancouver veterinarian, who was the speaker for the evening. Dr. McDonald spoke on Radiography of Animals and explained how this was done. Our members discovered that there is a vast difference in radiography of dumb animals and vocal ones. However, Dr. McDonald's talk was very much appreciated by those in attendance and proved to be most interesting as well as instructive. Mr. Jack Monk, chief radiographer at the hospital, thanked Dr. McDonald in a few well-chosen remarks. Refreshments were served by the x-ray staff to round out a very enjoyable and happy evening.

Meetings for the balance of the year have been arranged by the Social Committee. The October meeting will be held at the Workmen's Compensation Board Rehabilitation Centre on October 24th and an outline of the Educational Programme carried out by the Centre will be demonstrated by staff members.

We are going to hold our Annual Christmas Party as usual. This will take the form of a party to honor our 1957 graduates. We are giving our members plenty of notice regarding this party and we all fervently hope that we will get a better attendance than similar parties have been accorded in the past.

Miss Donna Brumpton and Miss Ethel Reese have left our Pacific shores and transferred their activities to the shores of Hawaii. They expect to find employment there as technicians and we all wish them the best of luck in that suny paradise.

VANCOUVER ISLAND BRANCH

The first meeting of the 1957-8 season was held at Royal Jubilee Hospital with Mr. Derrald Thompson in the chair. A new item has been added to the monthly meetings when the Programme Chairman, Mrs. Bates, will explain the function of the C.S.R.T. This is a splendid idea as it will give new members some idea of the importance of the organization. Mrs. Alexander has been appointed Nominating Chairman for the election which will take place at the November meeting.

Dr. F. Bonnell was the speaker at this first meeting and he chose as his subject "Mastoids." Dr. Bonnell explained the different positions and demonstrated each by means of diagrams and anatomical specimens. He also explained that the use of antibiotics had materially reduced the necessity for mastoid films. He was introduced by Miss Paterson and thanked by Miss Birley. Dr. Bonnell's lecture was enjoyed by all those present because he explained each phase in terms which all could understand.

The following students have been accepted for training at Royal Jubilee Hospital. Miss Patricia Vickers, Miss Patricia Townsend, Miss Maureen Lamb, and Miss Betty Adams. We wish them success in their new careers.

Continued on page 162

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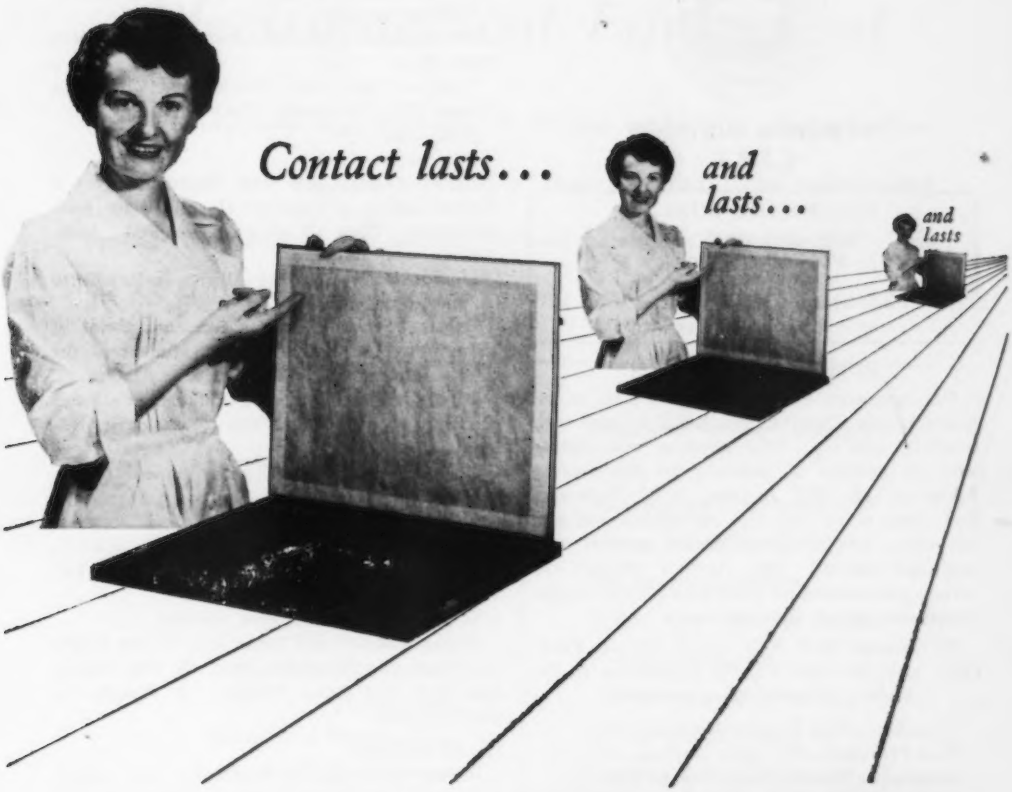

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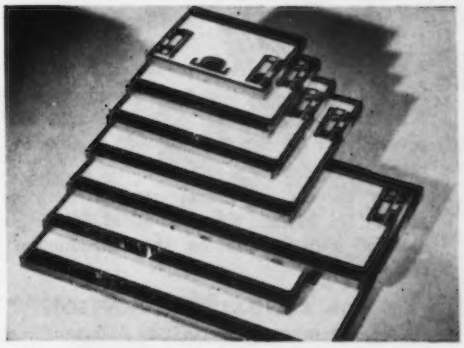

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EDMONTON SECTION

On September 9th, 1957, at 8.00 p.m., in the Miseriacordia Hospital, the E.S.R.T. held their monthly meeting. The meeting was opened with an address of welcome by the retiring President, Mr. Bill Andrais, R.T. Following there was a roll call and introduction of new members. The minutes of the last meeting were read and adopted. Mr. Andrais thanked the various committees for their support and accomplishments during their past term.

Mr. George Hall, R.T., the Provincial President, took the chair for the installation of the new executive officers and committees.

President—Miss Naoma Mockford, R.T.
Vice-President—Mr. Billy Andrais, R.T.
Secretary—Miss Florence Feniac, R.T.
Treasurer—Miss Jean Cote, R.T.
The Focal Spot Representative—Mr. Ken Noden, R.T.

Mr. Bill Andrais was presented with a gavel for his efforts in the past presidential year. Miss Lucy Groom was to be presented with a silver spoon for her contributions as past secretary-treasurer.

The various committee reports were then given. Dr. Mallett was introduced as the guest speaker with a talk on the introduction to radiography.

17th ANNUAL CONVENTION

On September 28th, 1957, at 8.00 a.m., in the Aberhart Memorial Sanatorium, the 17th Annual Convention of the Alberta Division was officially opened by the president, Mr. George Hall, R.T. Following there was an address by Dr. H. Stephens, Medical Superintendent of the Sanatorium, and greetings from the Association of Radiologists by Dr. R. M. Clare, radiologist from the General Hospital.

The convention programme was as follows:

Business sessions.

International Convention Report—Miss Eileen Short, R.T.

Paper — "Radiation Protection," by Ken Noden, R.T., University Hospital, Edmonton.

Java time.

Business sessions.

Paper—"Advantages and Disadvantages of Technicians in a Country Hospital," by John McIntosh, Olds Municipal Hospital, Olds, Alberta.

Smorgasbord—Courtesy Alberta X-Ray Service and Supply Men.

Paper—"Training from a Student's Point of View," by Miss Sydney Smith, student of the Colonel Belcher Hospital, Calgary, Alberta.

Paper—"Training from a Radiologist's Point of View," by Dr. M. Mallett, radiologist, Edmonton, Alberta.

Open discussion on the above topics.

Business sessions.

Refreshments.

Paper — "Surgical Treatment of Heart Diseases," by Dr. C. Ross, thoracic surgeon, Edmonton, Alberta.

Post-convention executive meeting.

Annual banquet and dance held at the Capt's Cabin with the Honorable Dr. J. D. Ross, newly appointed Provincial Minister of Health, as guest speaker.

IN SUMMARY

During the month of September the various committees were very active, and especially so in their preparations for the convention, and the new term of offices.

"The Alberta Technician" was introduced as the official journal of the Alberta Division, and distributed to all technicians and associated persons in the province.

The executive and committees are to be commended on their efforts to produce one of the best conventions the province has seen. The increased number of papers and exhibits, the province-wide attendance, and the heated business sessions of the convention are indications, we hope, of increased interest and activity.

It is with satisfaction that I submit this report on the activities of the C.S.R.T. Alberta Division, Edmonton Section.

—KEN NODEN, R.T.,
The Focal Spot Representative.

Calgary on page 162

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NEW BRUNSWICK SOCIETY OF X-RAY TECHNICIANS

The highlight of the Fall meeting of the N.B.S.X.T. held at Lancaster D.V.A. Hospital, was a report of the International Convention, given by Miss Kay Creelman, our President. The technical and social aspects of this meeting were described. It certainly made the members who were unable to attend, realize the benefits which can be obtained by attending such a meeting.

Applications from new students were accepted by the Society, effective January 1st, 1958. These students are: Jocelyn Picot, Bathurst; Elizabeth McCluskey, Ellen O'Brien, Marilyn Hamm, and Ann MacKinnon, all of Saint John. These girls have begun their training at St. Joseph's Hospital.

During the evening Miss Barbara Smith, R.T., described her recent trip to Europe which she made under a specially conducted tour.

We had an invitation to hold our next meeting at Hotel Dieu in Moncton on November 30th, and this invitation from Sister Louis was gladly accepted.

Lunch was served by the technicians at the close of the meeting.

NEWS FROM NEW BRUNSWICK

A recent graduate of St. Joseph's Hospital, Diane Cooper, has taken a position at the Provincial Hospital, due to the departure of Joyce Flood. Joyce enters her third year at Dalhousie University, Halifax, N.S.

Jane Secord, from the Saint John General, is now on staff at King's County Memorial Hospital, replacing Mrs. Betty Kyle.

Congratulations are in order for the former Margaret Fiztgerald (Martin) on the birth of a daughter. Also they go out to Joan Ronald whose marriage took place recently.

A wedding of interest to Saint John technicians is that of Laura McAllister, R.T., to Donald Bursey, R.T. Both are employed at the General Hospital.

—CLARE HUTCHISON, R.T.,
The Focal Spot Representative.

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CENTRAL SECTION

The first meeting of the 1957-58 season was held at the Brantford General Hospital on Oct. 25th, 1957. The meeting was called to order by the Chairman, Miss Joan Duncan, at 8.30 p.m.

Mr. Leslie Fox, Chief Technician, then welcomed the group on behalf of the hospital.

Miss Marilyn Priest, technician at the Brantford General, presented a paper on Treatment and Planning in X-Ray Therapy. This was of interest not only to those directly connected with the treating of therapy patients but to all technicians present.

Dr. W. E. Crysler, Director of Radiology at the hospital, spoke proudly of their new department and also of what appeared to be in store for technicians in the future.

Miss Jean Hutchinson, student technician at Mount Sinai Hospital, spoke on Radiography of the Knee. This covered anatomy, various positions and technics used. Another Brantford technician, Miss Margaret Brand, gave an illustrated talk on Construction and Application of the Tri-Section Cassette. This demonstrated how tomographs of extremities and special areas could be made without the usual lengthy procedure, by the use of one cassette specially constructed to hold three films, giving an average plus a shallower and deeper cut with one exposure.

Miss Martin, President of the O.S.R., gave the technicians a few words of encouragement about the wage scale and for further news concerning this watch the Bulletin. The final item was a most interesting movie entitled "First a Physician." Refreshments were then served in the hospital cafeteria followed by a tour of the new X-Ray Department.

—LOIS ADAMSON, R.T.
Secy. Central Section.

Ont. continued on page 166

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NEWS ITEMS FROM THE PROVINCES

LAKEHEAD SECTION

The April meeting of the Lakehead Section was held at St. Joseph's General Hospital, Port Arthur, on Wednesday, April 10th.

In the absence of the regular Chairman, Mr. J. McGie presided over the business portion of the meeting during which further consideration was given to the Washington Convention.

An interesting colour film on Pyelography was then shown and proved of considerable interest. Our thanks to Winthrop-Stearns Ltd. for making this available. A novel programme item was then introduced when by means of a portable television set the members were able to view a TV film entitled "Medical Horizons," which dealt with the research and use of insulin in the treatment of diabetes. We are indebted to the management of the Lakehead Supermart who kindly provided the television set for this occasion.

Mr. E. R. (Bud) Baxter of General Electric X-Ray Co. then gave a very complete description of the wiring and flow of electrons in a basic x-ray machine. By means of two large electrically wired panels complete with valve-tubes and x-ray tube Mr. Baxter traced the course of the various component circuits in the x-ray machine and the use and function of each. For the student members particularly this proved a most revealing and informative address.

A lunch was then served by the members of the host hospital to round out the balance of the evening.

McKellar Hospital, Fort William, was the scene of the May meeting held on Wednesday, May 8th.

Following a short business session plans were made for the Annual Summer Social with the chosen date to be May 25th. Mr. P. Hnatiw kindly offered his camp at Grand View for the party and offered to head the arrangements for the event.

Mr. Harry Horney then introduced the guest speaker, Dr. L. A. Remus, of the Ridgeway Clinic, Fort William. Dr. Remus chose as his topic for a most interesting address, "The Definitive Trend in the Treatment of Fractures." In his talk the speaker described many of the types of fractures encountered in day to day work and the various methods in dealing with and treating such cases. By means of radiographs on these cases Dr. Remus described how certain methods of dealing with these fractures were preferable to others and resulted in a more satisfactory end result. In summarizing his address the speaker mentioned that over the years a certain uniformity of procedure was emerging in the treatment of such fractures, based on the results of the various methods of treatment used in former times. Mr. Horney then moved a warm vote of thanks to Dr. Remus which was heartily endorsed by all present.

A delicious buffet luncheon was then served by the McKellar x-ray staff.

A poorly attended meeting of the Lakehead Section was held at the Port Arthur General Hospital on Wednesday, June 12th.

Mr. Harry Horney, our popular Chairman, advised that he would be leaving us shortly for more eastern parts and expressed his regret that this would be the last meeting he would be present at. Mr. Gore on behalf of the members moved a warm vote of thanks to Mr. Horney for the enthusiastic manner in which he had worked on behalf of the Lakehead Section during his stay here and wished him every success in his new position.

Miss Helen McKay then presented a very complete coverage of the Washington Convention and described the daily activities and programme that had taken place there. She concluded her description by stating that from an educational and social point of view the Washington meeting was unsurpassed and expressed the hope that more members might be able to attend such future conventions.

A notice of motion was then served to the effect that in future years the June meeting of the Section would be cancelled due to so many members being on holidays and busy with other affairs. This matter will be voted on at the next meeting.

The date of the September meeting was advanced to Wednesday, October 9th, to be held at St. Joseph's General Hospital, Port Arthur.

SUMMER HAPPPENINGS

The Lakehead Section lost two popular and valuable members during the summer in the persons of Mr. Harry Horney of McKellar Hospital and Mr. John Logan of the Port Arthur General Hospital. Harry has gone to St. Thomas, Ontario, while John has chosen Burnaby, B.C., as his new headquarters. We wish these members every success in their new positions.

Cupid spent a busy summer also amongst the technicians in this Section and our congratula-

Continued on page 205

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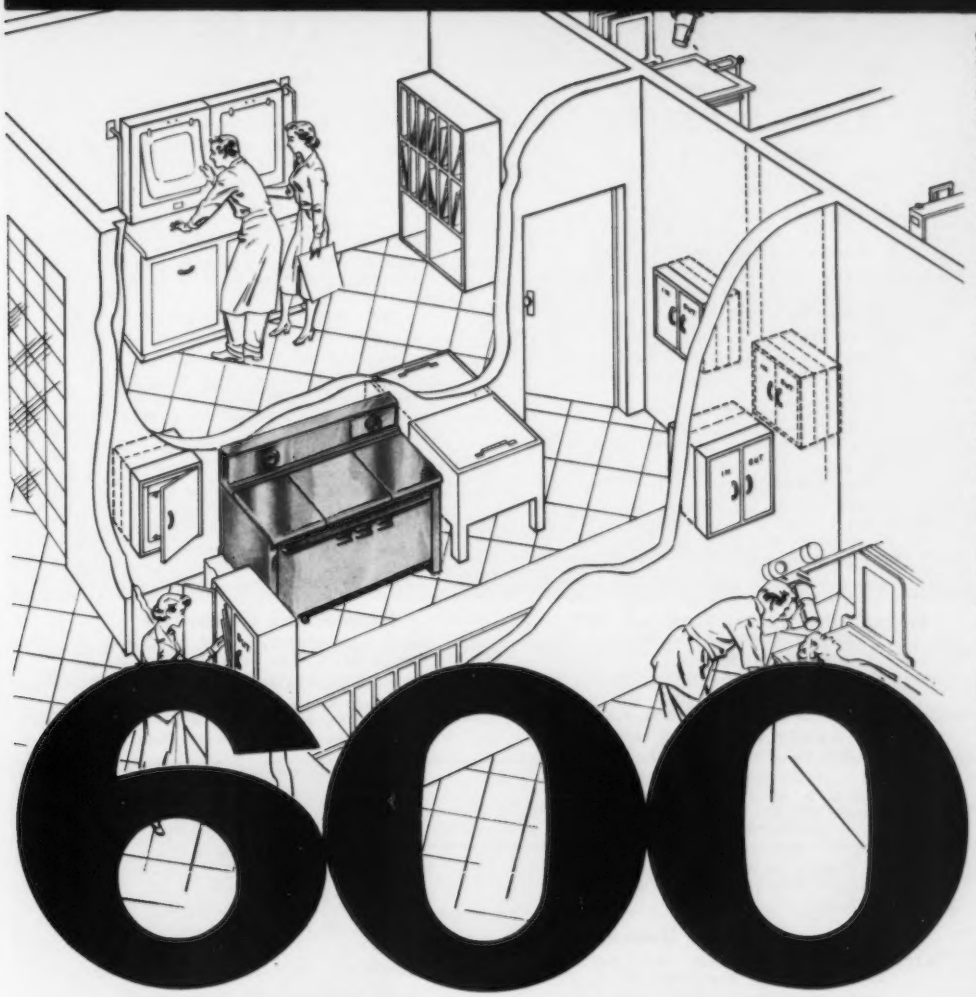

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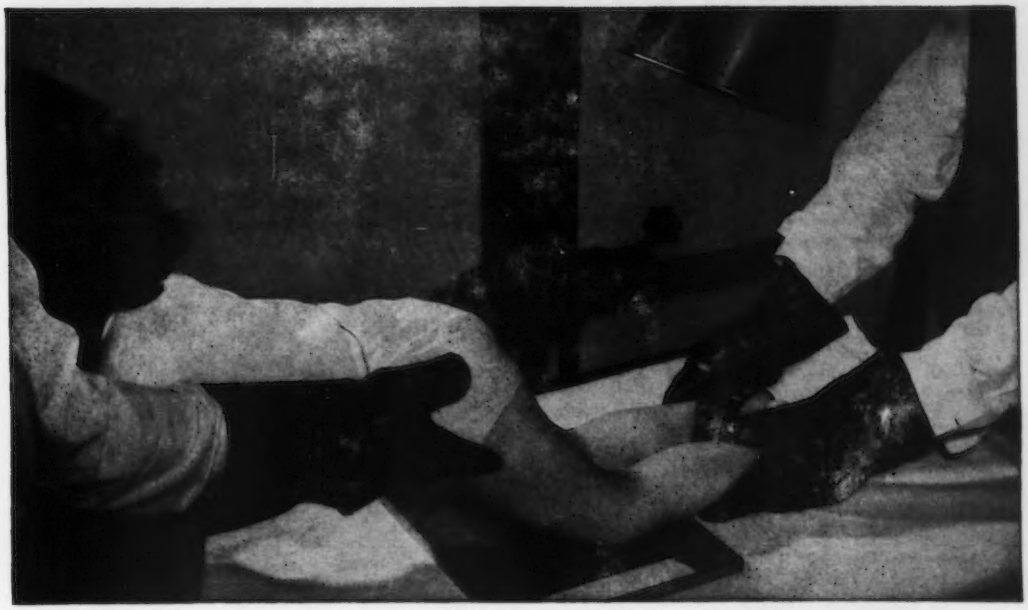

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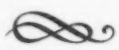

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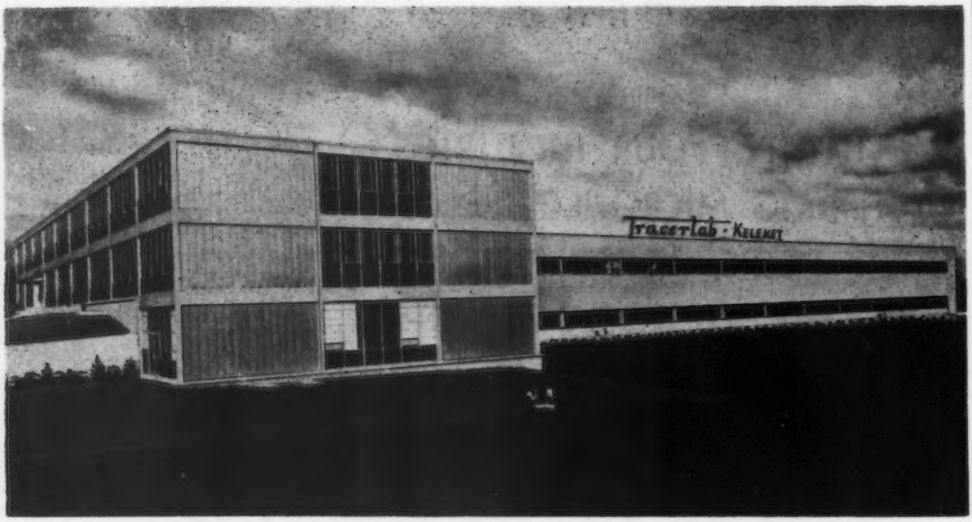

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"All our ambition should be devoted to a faithful fulfilment of duties towards others as well as to ourselves."—Roentgen.

LESLIE J. CARTWRIGHT, R.T.
EDITOR

Volume 14 TORONTO 1957 NO. 4 *Issue No. 57*

Jerman Memorial Lecture

THE CORE AND THE SUBSTANCE

By MARY F. CAMERON, R.T., Hamilton, Ontario

TO THE life and work of Eddy C. Jerman, we owe this moment—as he was the prophet who inspired the calling of "x-ray technician," accepted the assignment of technical education and, concurrently with the success of his efforts, modeled the pattern for a "Society of X-Ray Technicians." He assisted in drawing up its charter and by-laws, and became its first president. To-day, thirty-seven years later, as members and guests of The American Society of X-Ray Technicians, we meet internationally and pause to remember the man who designed our heritage.

I lack the privilege of having known him personally, but, seated on the barium barrel in the first darkroom in which I worked, I met him through the medium of the pages of his book—"Modern X-Ray Technic." During apprenticeship, this served as my only radiographic textbook. Many present to-day probably know little of the history of this dedicated man. May I refer briefly to the record? Eddy C. Jerman, born November 21st, 1865, was a doctor's son whose interest in electricity originated when toying with a battery at school and progressed with the investigation and repair of electrical apparatus in his father's office. Pursuing his scientific course, he undertook the manufacture of cautery and static machines, until, at the time of Roentgen's discovery of x-rays in 1896, he found himself equipped, with the exception of the Crookes Vacuum Tube, to perform the same type of experiment. Procuring the tube by 1897, and energizing it with a Pattee Static Machine, he produced waves that showed bone shadows on a photographic plate. Using his own hand as a subject, he bound it with adhesive tape to obviate movement while a thirty-minute exposure was made.

The Victor X-Ray Corporation provided the setting where Eddy C. Jerman, as writer and instructor, developed an educational programme and taught both radiologists and technicians. There, he also acquired and trained a highly specialized group of instructors. Under the guidance of the master radiological technician as director, this group formed the nucleus of the educational department of the x-ray section of the General Electric X-Ray Corporation. Honored by his alma mater, Franklin College, Mr. Jerman was made a Doctor of Science in 1929. The year 1936 terminated the life of this great scientist. In the twenty-nine years

Presented at the 2nd International Convention, Washington, D.C., June, 1957.

that have passed since his first published book, his words and works have become established forms of teaching. We are still enumerating the essential technical factors of a radiograph as kilovoltage, milliamperage, time and distance, also teaching our students that film quality will depend upon detail, distortion, contrast and density. Radiological training and equipment have far outsripped any estimates of Jerman's day, yet oddly, the "essential qualities" of an x-ray technician of promise, American or Canadian, remain the same; mature judgment, honesty of purpose, good health, cleanliness, but above all "character," which he lists at the top as essential to any line of human endeavour.

Earlier technical publications touched but lightly upon the subject of anatomy. It seemed quite fitting, therefore, that upon the establishment of a Jerman Memorial Lecture by the A.S.X.T., H. O. Mahoney, one of Dr. Jerman's own students and co-instructors and a great anatomist, was chosen to present the first of these lectures. In discussing his chosen subject, "Radiographic Study of Anatomic Sections," Mr. Mahoney mentioned that early in his own career it had become apparent that "in anatomy lay the crux of successful positioning"; thus did he speak of "the substance." While listening to that superb lecture, I little thought that, at the Second International Convention of X-Ray Technicians, you would accord me the privilege of representing the A.S.X.T. at this second lecture of the second decade of these memorable occasions.

Your invitation led me to reflect upon student and apprentice days, to attempt to recapture the apprehensive enthusiasm with which one tried to produce good radiographs. Success could only be attributed to what might be termed the "magnetic induction" of the early teaching of Ed. C. Jerman. He represented "the core," his associates, the vehicle for magnetic lines of force by way of sound guidance. Thus were technicians "energized" into becoming informed personnel who have influenced technical standards for over a quarter of a century.

A brief review of Jerman's life has left a vivid impression of three words—investigation, education, and heritage. Though born since Roentgen's discovery, participants in the development of the science of radiology think of Roentgen first as an investigator. We think of Jerman in like terms, then as an educator. As to our heritage, we must ask ourselves "wherein have we blessed it?"

Educationally, the years have been fruitful. Individual and organized efforts are steadily providing a sound educational programme and adequate training schools. We may now refer to a "curriculum," and specific training schools, and any claim that training is "not available" would seem without basis; in fact, we may affirm that the challenge of technical education is being met and required standards established. The educational pattern leads me to mention the absorption factor. This, for years, has proved a somewhat baffling subject. So much so that even now the old order of the "r" (or roentgen unit), as measured in air, is gaining a partner, the rad or rem, which is measured by the absorption in the tissues themselves.

We know that we have a quantity (volume) and quality (ratio of mass of object to volume) of substance as well as a quantity and quality of radiation.

With this in mind, would it not be wise to consider a change in our teaching of the topography of the body as more applicable to radiographic technique? The plans we have adopted and taught were from medical texts and apply

especially to the practice of medicine and surgery. The median-sagittal plane was common to both plans, the first being subdivided by two horizontal planes—the transpyloric and transumbilical. The second was again subdivided by two or more sagittal planes, making nine sections in all. These four quadrants, or nine regions, no doubt enable the surgeon to orient more closely the structure to be treated or removed but the x-ray technician views the problem from the standpoint of subject type, respiratory phase, thoracic, abdominal or pelvic location, and absorption characteristics of that particular area.

The actual skeleton will best impress upon the student's memory the osseous structures and their prominences, the latter to be used as external palpable landmarks. It will also emphasize the fact that there are body cavities—the skull, thorax, abdomen, and pelvis. Authentic anatomical drawings showing the organs and viscera in situ will identify their position in these cavities. Radiographs of the chest will show aerated lung fields within the thorax, the vascular markings and heart shown against the aerated structures because of the increased absorption within them. The diaphragm will be shown as nature's line of division between thorax and abdomen. The dimensional increases of the thorax are effected by the action of the diaphragm. On deep inspiration, the vertical diameter of the chest cavity will increase from 3 to 6 cm., the abdominal viscera being forced downwards. Does this not indicate that while we retain the teaching of the median-sagittal plane in radiographic topography, we might well substitute the trans-diaphragmatic plane of division for that of the transpyloric as employed in our textbooks at present?

Again, the structures within the abdominal cavity, influenced by the process of respiration may be shown in a KUB film. This, however, is the most weight-assuming area in the body and a region of absorption variations demanding an equally varied range of techniques. The outlines of kidney, liver, psoas muscle or gas-filled portions of bowel may be defined due to the differences of absorption in their structure as to that in surrounding fat. The major portion of the digestive system lies within the abdominal cavity, space for its action being provided by a large, closed bursa—the peritoneal cavity. The limit of the peritoneal cavity lies at the transpubic line, inferior to which lie the urinary bladder, prostate, and seminal vesicles (or uterus in the female), and rectum, all structures within the true pelvis. With the exception of the pregnant uterus, urine-filled bladder, air-filled colon or rectum, which differ in specific gravity, the remaining pelvic structures may only be defined by the introduction of opaque media. Would it not seem logical to adopt the transpublic line as our second line of division, bisecting the median-sagittal, rather than the transumbilical in identifying the position of structures in radiography?

The Absorption Factor and the Technique Chart

Wherein do the quality and quantity of body substance affect the technique chart? While pursuing a study of the effect of various wavelengths in isolated specimens of body tissues, it was enlightening to me to find that absorption in fat as to muscle will vary as much as 62.5 per cent. This is an advantage in soft tissue radiography of the obese subject, but a detriment in x-raying the spine or chest of an industrial laborer. The rules of dealing with these variations are known to us all. We raise kilovolts to increase the contrast scale of densities and level contrast in the film emulsion, or control absorption contrasts by means of compensating filters of a

chosen type and medium. But what of our technique charts? Universally, they bear a record of kilovolts, milliampere-seconds, distance, centimeters, cones and filters, but what of the weight factor? Is it not of importance with regard to the unit volume? Familiar to all of us is the radiographic image of a 27 cm. chest showing a very small thoracic cage, surrounded by great depths of soft tissue, also that of the 27 cm. chest of a broad, muscular person, fully expanded and covered by only thin layers of soft tissue. Textbooks and articles are full of charts classifying types in three groups and advising consequent kilovolt increases or decreases, but wherein can we aid the inexperienced in developing the necessary judgment?

"Stock taking" is essential to any business; it is also essential to any successful career. Procedure surveys will help assess the weak spots in either the technical or administrative work of any x-ray department. A recent survey of 200 chest cases, with a technical staff of six all measuring the centimeters, estimating kilovolts, et cetera, as to subject types, proved revealing. For instance, in chests of similar measurement and appearing very close as to subject type, a wide margin of error was shown. This was attributed to hasty measuring or snap judgment. In other words, adherence to one technique chart produced too variable results in a field where accuracy of duplication is so important if films are to be compared.

Charting of the weight of each person was requested, in addition to centimeter measurement and technical factors. The radiographs produced were carefully studied and suggestions for technical improvement noted in the "remarks" column.

Time does not permit me to quote the complete figures of the survey to-day. Herewith are the findings on five groups of ten chest patients. The ten chests of each group share the same measurements:

18-19 centimeter group—weight variance 83 pounds; kilovolt variance 11 kv.

21 centimeter group—weight variance 94 pounds; kilovolt variance 15 kv.

22 centimeter group—weight variance 39 pounds; kilovolt variance 9 kv.

23 centimeter group—weight variance 93 pounds; kilovolt variance 15 kv.

26-27 centimeter group—weight variance 65 pounds; kilovolt variance 13 kv.

Technically, these findings indicate alteration in the kilovolt factor in alliance with centimeter measurement and weight differences; in fact, a revised technique chart with an additional "weight" column.

It may be noted that in the 22 centimeter group (which is average) there is the least weight variance and adjustment of kilovolts. The weight scale in this group was from 161 to 200 pounds, the kilovolt range from 71 to 80. In the extremely heavy groups (26-27 centimeters), the scale is slightly higher, but still less variable than in the other groups. Presumably in approaching these higher measurements we are dealing with muscle, not fat, as the latter is more compressible and measures less. The majority of patients in this category are of heavier weight, yet as our study progresses we find that in patients of this measurement weighing up to 175 pounds, the same technical factors may be used as for 23 and 24 centimeter patients of the same weight. From this point, weight increases are rapid, consequently the adjustment of kilovolt steps is much higher. As this chest survey continues, patients are being classified as to centimeter measurement in five groups, the spread of kilovolts is being studied in each group, then ex-

amples of similar weight from each group compared. Currently we are finding that in the lower measurement brackets (100 to 130 pounds) the range of kilovolts is somewhat static, but as weights approach the middle range of 145 to 160 pounds, technical factors become more similar in all groups, while repeatedly satisfactory radiographs are being made of patients weighing 170 to 175 pounds from any of the five groups up to 27 centimeter measurement with identical kilovolt adjustment.

Upon assessing our findings in 500 chest cases it is our intention to chart test techniques in groups according to weight, accompanied by centimeter measurement, kilovolt steps to be adjusted for every ten pounds of body weight, allowances being made for age, height, severe illness, et cetera. Psychologically, this survey has aroused a consciousness in the minds of the the technical staff of the importance of reckoning weight as well as depth in the judging of subject types.

A further sphere of usefulness of the procedure survey is that of charting the care of intensifying screens. One of the most minimal but annoying distractions in demonstration of the finer absorption differences in body tissues is that of foreign bodies in cassettes. The dust particle, chip of nail polish or bit of hair adherent to an intensifying screen cuts off the fluorescence or visible light in the screen, preventing it from reaching the film and causing an opaque area in the radiograph. This frequently demands explanation if occupying the site of the pineal gland in a skull film or overlying the probable location of a foreign body in the orbit.

Perfection, of course, is the aim of all, yet only striven for, never quite achieved. Screen cleanliness is one step towards its achievement in radiography. Weekly screen care by way of cleaning, inspecting, and servicing, if faithfully charted, may be checked for technical failures regarding their use.

An effective method is that of numbering each cassette externally (on adhesive tape), marking date of screen mounting, a small duplicate number being "inked" in on the screen itself. Numbers of all screens should appear on the survey chart, followed by columns for the recording of cleaning, blemishes, condition of screen, et cetera. A summary such as this will provide a study of the life and stability of screen types and will also reveal many interesting screen characteristics. It will keep the radiologist informed of equipment condition and exert a psychological effect on all technicians to exercise greater care.

Investigation

With the advent of vascular surgery, it became necessary for most x-ray departments to establish facilities for femoral arteriography, whatever the vintage of x-ray equipment. To both radiologist and x-ray technician, this offered a challenge, and current medical literature reports many satisfactory procedures. Most of these, however, employ the use of grid or Potter-Bucky diaphragm. The necessitated speed of injection and transit of the opaque medium make it obvious that these must be reciprocal or fast grids.

A sturdy cassette tunnel frame built for table-top use was our only alternative, and in copying such a model from another department, reports were received that the top sagged with the patient's weight, binding cassette movement beneath. The testing of various thicknesses of masonite, hard and soft woods, et cetera, finally led to the thought of ¼-inch plate glass. All samples were radiographically tested with a leg in situ and a penetrometer. Bass wood and plate glass were very similar in absorption, but it was found that the glass provided a filtration effect thought

desirable in the soft tissues of femoral arteriography, as well as a stable, unbending surface. The frame was built by our maintenance man, according to our own design. The absorption effect in the widely differing depths of tissue was compensated for by wedge-shaped iodine filters which we are using with continued success.

While completing this study of materials with regard to absorption and stability, the problem of scatter and its diffusing influence arose. The 14 x 36-inch cassette used in femoral arteriography was masked with one-quarter inch lead to provide two 7 x 36-inch exposures. The use of table masks as against cones for control of scatter came under discussion. This stimulated interest in lead pinhole experiments. Lead filters were made to fit within the various cones, a small, pin-hold aperture being punched in the centre of each. These were installed within the cones and exposures made with and without bucky, with and without table masks, also with various sizes and lengths of cones. Tests were also made with the cassette directly on the table top, then superimposed on lead rubber.

Findings proved that the use of the table mask made a more attractive looking radiograph because it showed a translucent border, more or less framing the image. Within the circle, however, there was more generalized film fog, greater at the cathode end of the tube. Experiments made with a long (12½ inches) lily cone, both with and without mask, showed improvement, the former markedly so, which indicated that this was the ideal cone for skull radiography. The extension cone, fully extended, showed still less diffusion effect and film fog but, because of the necessary increase in distance to provide size of field and consequent exposure increases, was ruled out except for spot films of a selected area made at short distance. Oddly, the use of the 12½-inch lily cone on a direct table-top exposure without bucky showed much fog, while this was corrected in a duplicated exposure with the cassette placed on a rubber apron. This led to a testing of table tops for scatter. A difference had been noted over a long period of time in radiographs made in two rooms where table tops were of different materials. The thought persisted that some materials used in making table tops and masks produced more scatter, causing more film fog. With this in mind, experiments were made with a lead mask, directly over the cassette, with a 2-inch square opening in the centre. The first exposure showed marked fog and diffusion. The second radiograph was made with an additional thickness of lead around the opening of the shield over the cassette; much less fog was shown and much less diffusion. These same experiments were repeated in the second x-ray room where an old-fashioned table is topped with a dull finish prestwood. These two radiographs showed practically no fog or penumbra. As the equipment varied somewhat in these two rooms, it was decided that a sheet of dull, unfinished birch plywood such as is used for table tops should be procured and the two experiments performed again in the same room with identical conditions and equipment. This resulted in a small, but definite evidence of film fog in the film exposed on the highly polished table surface, and would lead to the assumption that this may be due to the difference in the effective atomic number of the finishing agent used to surface the table, and the unsurfaced plywood.

In conclusion, as individuals, the records of our publications show consistent effort on the part of many technicians to investigate; yet the thought occurs that experimentally we are losing out to the speed of a science which has become too critical by way of hazard to be played

with experimentally and too mechanical technically to provide much scope for investigation. My purpose to-day has been to prove to you that not a routine day passes without an opportunity to work out an idea, improve a position, or evolve a better technique.

As in Jerman's day, the paths of investigation lead ever onward, and in the words of Carlyle, we may think of him as "the prophet who inspired men to shape their lives to action, to live them truly and to busy themselves day by day upon the worthiest of all the ways of work within their reach. We cannot look, however imperfectly, upon a great man without gaining something from him."

Acknowledgment

I wish to express grateful acknowledgment to our radiologist-in-chief, J. G. Stapleton, M.D., for revision of this lecture, also to Jane Martin, R.T., for her wonderful support in photographing slide material and assisting me in innumerable ways.

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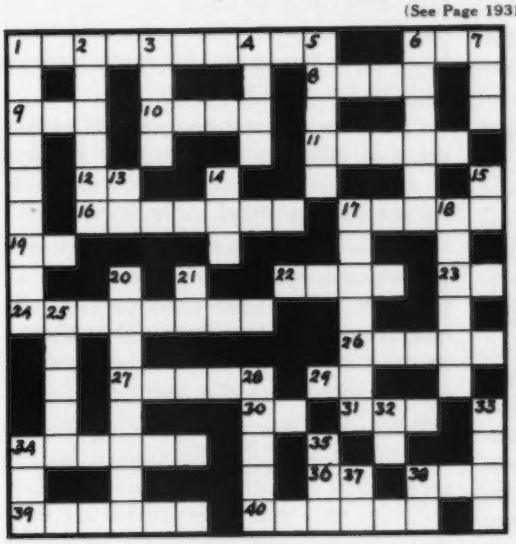
Radiographic Crossword

By Kathleen Coulen, Providence Hospital, Seattle, Wash.

(See Page 193)



ACROSS

1. The bones of the hand.
6. A secretion from inflamed tissues.
8. Before.
9. New, or recent.
10. The Spleen.
11. A cord-like structure.
12. Towards.
16. Inferior segment of the sternum.
17. A depression.
19. Within.
22. Pertaining to the anus.
23. Along with, together.
24. The bone of the lower jaw.
26. The astragalus.
27. Pertaining to the nose.
29. Denotes a quality of root notes.
30. Presents idea of activity of the word.
31. Between the knee and the ankle.
34. Pertaining to the face.
36. Denotes hindrance.
38. Pertaining to the ear.
39. The foot (proximal segment).
40. Bone on outer side of the forearm.

DOWN

1. Uppermost part of the sternum.
2. Portion between the neck and the abdomen.
3. A minute portion of living substance that is enclosed in a membrane.
4. Situated between the mid-brain and the medualla oblongata.
5. A stiff sharp pointed process.
6. Supports the spinal column.
7. Under or low.
13. In double.
14. Much or many.
15. Milliampere.
17. Front of the skull.
18. Between the lumbar and the coccyx.
20. Mucous membrane lining the pharynx.
21. Away from.
25. Large vessel arising from the left ventricle.
28. Largest glandular organ in the body.
32. Within.
33. Terminal part of the lower extremity.
35. Pertaining to the foot.
37. Two-fold, twice.
38. Pertaining to bone.

TWENTY YEARS OF "HEALTH HELP" OR "HEALTH HAZARD"

By J. Frank Weale, R.T., Hamilton, Ontario

DURING the past few months much has been written both in the United States and Canada about the hazards of radiation and the dangers to the present and future generations. This is said to be partly due to the large numbers of x-ray examinations which some writers claim are excessive.

In the October issue of the magazine "Pageant" is an article entitled "The New Invisible Death Around Us" and an article appears in the December issue of MacLean's Magazine, "How Serious is the Threat of Radiation? Dangers in Disguise." The January 1957 issue of "McCall's" features the following headline, "Radioactivity is Poisoning Your Children." The magazine has an article dealing with the excessive use of x-rays and other radiation entitled "The Fight for Survival."

Reviewing these and other writings I am almost presuaded that my choice of vocation—operating a machine as an aid in the diagnosis of ailments leading to better treatment subscribing to healthier and therefore happier people — has boomeranged. I am now classed as a hazard to the health of my fellow men.

All my ideals have not been shattered however, because there are also publications which refer to me as "The Radiologist's Right Hand." This description is in the fall edition of the publication by the American College of Radiology, "Your Radiologist." In this and other writings I am often referred to as "The Important Cog in the Medical Team." So the question—am I a help or a hazard?

After very careful thought I can say in all honesty and sincerity that my ideals are being realized and I am part of the medical team doing good and aiding my fellow man.

I am persuaded that my occupation as a qualified radiographic technician is indeed for good because (to use a colloquialism) I have the "inside dope" whereas the people who write of the hazards are on the outside and therefore refer to that which they do not always understand.

The prime requisite is to have complete knowledge concerning the type of radiation we use. We must therefore know the exacting demands to safeguard our patients and ourselves from any amount of radiation which might in any way be harmful to present or future generations. Our duty is quite clear—to realize the danger associated with x-rays and know how to use this great diagnostic medium without the slightest hazard.

I feel sure that our many varied experiences in different locations will be used to advantage marking well the errors as hazards to be avoided in the future.

I know that you who have experienced near hazards will agree that any such experiences could have been avoided and look to the day when there will be legislation and definite rules which will prevent any hazardous situation arising.

Due to the efforts and planning of some radiologists and senior technicians a good programme of training has been in effect for some time and all graduates are fully aware of their responsibilities before the R.T. is attained. Therefore many R.T.'s will find some of the following remarks concerning hazards quite outside their experience; especially those who are members of a good medical team.

The question arises—why were any dangerous situations permitted? Who

C.S.R.T. Essay Award, Second Place, 2nd International Convention, Washington, D.C., June, 1957.

was responsible? Could not something have been done to avoid the possibility of any x-ray work being a hazard?

A chain is only as strong as its weakest link and a team can only succeed if all members adhere to the absolute in team work. Our team must strive for complete diagnosis and successful treatment of the various ailments with the x-ray portion of the diagnosis being kept to the absolute minimum amount of radiation. Our team would certainly do well to support a resolution which might be worded as follows—"Resolved: To Obtain the Maximum Diagnosis from the Minimum Radiation."

Some past experiences, I am sorry to say, would indicate that the minimum was hardly considered, but r a t h e r what amount of radiation could be tolerated. Many hazards we may have experienced were seemingly unavoidable. In some cases the technician had no control over the situation and in other cases the hazards were created by the technician. I think it safe to say that any such cases were the result of poor team work. I wish to present a few examples for your consideration.

(a) A small hospital. A nurse or an orderly doing the x-ray work under the supervision of the surgical or medical consultant. The first films may clearly demonstrate fractures or pathological conditions, but many extra films were required to prove the diagnosis to the untrained in radiology. I refer to the case that requires immediate treatment prior to the visiting radiologist's report.

(b) We have the untrained technician who may be substituting during the R.T.'s day off or even doing all the small amount of technical work required in certain locations. By making full use of the text book on positioning the person may by the trial and error method produce some diagnostic films. The main concern is to obtain diagnostic films—regardless of permissible dosage.

This same person may be called upon to set the fluoroscope in operation for a doctor whose eyes are not accommodated. Could there be a worse combination? Two hazards. The demand for increased M.A., and bare hands. It is most unlikely that such a situation occurs only once a year.

Relating to hazards A and B. These were created through lack of knowledge and planning by people attempting to run an x-ray department without the only people qualified to provide the service. Can you imagine engineers building a locomotive and starting it on its merry way with only the conductor who rides in the caboose? The engine was not built to travel safely this way.

X-ray equipment should not be operated unless a radiologist orders the operation. If the radiologist is not in the office or hospital on a full time basis he should appoint none other than a fully qualified R.T. to operate the x-ray equipment. I would say a rule should apply that the less time a radiologist spends in an x-ray department so much greater will be the demand for a technician with the highest qualifications. The department without a full time radiologist is the place where only a super technician should do any x-ray work. If the medical team is unable to make rules governing the operation of x-ray equipment in such instances, the Provincial or Federal Governments should have some v e r y definite legislative control.

(c) Many technicians have experienced the following problem: A patient arrived with a requisition from the "Great Master-mind" who sees himself as the whole team. He gives the orders for creating the hazards and blames the other members of the team for any possible ill effects.

The requisition carries the famous letters N.Y.D.,* and requests films in various positions, weight bearing and otherwise, plus a few tomograms, the total representing a real hazard. The patient imparts the information that x-rays have been made on two previous occasions of the same anatomical region in other

* "Not yet diagnosed."

departments.

Your well qualified radiologist would have required four or five films at the most to write a complete report. So the question—why were the previous x-rays of little or no diagnostic value? Had the attending physician ordered films of the right area? In other words had the clinical examination been complete? This is of utmost importance if the team is going to win without hazards. Were the films of good technical quality? If they were not the technician should feel greatly disturbed because without good films the team certainly can never hope to win. That technician is not only responsible for creating a hazard, but is guilty of prolonging the patient's ill health.

The radiologist is definitely the team captain whenever x-rays are required. His training and qualifications have placed him in the captain's position, and he knows and orders the films which will be required to demonstrate any pathological condition in the anatomical area under question. His duty to the team, and all concerned is to know the complete answer. The x-rays are taken for his diagnosis and after good films have been supplied as ordered by him, his word must be final, and his whole future depends on his report. Any tendency by a consultant or others to err in this report is simply helping to create another hazard.

I think you will agree that not all hazards are experienced in the small departments, or in x-ray rooms where the equipment is somewhat outdated.

(d) In some up-to-date departments we may find the combination of super spot-film device, and simplified exposure buttons very attractive to the inexperienced. Many examinations are made with multiple spot and routine films, but no diagnosis. The examinations are repeated by the more experienced and turn out to be negative because of the error in preliminary diagnosis. By the time the proper examination has been completed the safe tolerance dose has been passed.

I think this true example serves to emphasize how important it is to allow only the experienced qualified personnel to operate equipment. The hazard is created, as in previous cases, because of the lack of team work. First, because of improper diagnosis, and secondly, because of someone's incompetence.

In any business (without the radiation hazard) incompetence is not tolerated. Therefore the hazard "D' is eliminated if only competent people are making the team.

In the Canadian publication "Mac-Leans'" the author places great stress on the harmful effect of x-rays in pregnancy. He uses some phrases (probably out of sequence) and attributes certain statements to a very good, and prominent radiologist. I don't think his writings pertaining to x-rays in pregnancy were just by accident because this examination certainly requires quite a few "r" (or radiation units).

If this examination is a hazard it is most certainly due to poor team work, and the team as in previous cases either creates, or eliminates the hazard. May I be allowed to cite one example?

(e) A qualified technician, with good training and the added knowledge gained from the articles on pregnancy by various people including our Mary Cameron and John Cahoon, did many pregnancy examinations as a member of a good and understanding team. The team work was accepted without qualifications in this certain city. Our technician had never taken more than four or five films at any examination, and the radiologist always forwarded a clear, concise report which described the position of the fetus, normal or otherwise. The location of the placenta is given and the report states whether the maternal pelvis is adequate, inadequate, or borderline. The report supplies the obstetrician all the informa-

tion required and, most important, is fully accepted. He approaches the delivery with confidence because he has the radiologist's report.

Imagine the surprise when in another city our technician, now an expectant mother, is requested to go for x-rays pertaining to her pregnancy. The obstetrician assists with the x-rays, views the wet films and requests more films in various positions, also does an injection with further films. This technician is now really worried and is in the shadow of her dreaded hazard—excessive radiation.

Once again you will agree there is no hazard unless created by lack of team work. If the technician is unable to produce satisfactory radiographs which will clearly demonstrate any abnormality, that person should not be doing pregnancy x-rays until fully qualified. The radiologist will have proved his ability before his examining board, otherwise he should not be attempting a report. If the obstetrician is not satisfied with the x-ray findings, some governing body should endeavour to bring the team work into line with the present day requirements to safeguard patients and future generations from any possible hazard.

Due to these recent publications we are now experiencing new problems.

(f) The patient who perchance is not long for this world if a prompt and an accurate diagnosis by x-rays is not made.

Our patient has read about "The Invisible Death" and is brought to the x-ray room. She sees before her "the scaffold" or the "electric chair" or believes the x-rays to be something even worse. After having positioned the unfortunate person on the table a few times (and because of fear and trembling) selected a technique using the shortest time possible, you set your exposure switch, only to have the patient start for the wash room. I feel that such a patient is really "scared." The literature is a hazard to the patient's life.

Following quite a few series your much x-rayed friend inquires whether the technician would presume him to be sterile and if not how many more radiographs would be required to complete the operation.

The only thing I can say regarding these cases is that those whose duty it was to impart truth and knowledge have imparted enough misleading information to make the statement true (even as applied to x-ray) that a little knowledge is dangerous.

As technicians we must strive for perfection in all our work, nothing else will suffice. As stated in a previous paper prepared in our department, I believe that many a diagnosis is made through the technician's good judgment in adding an extra film of a certain area, which may quite probably preclude the necessity of another examination.

We must use every means at our disposal to reduce the amount of radiation without sacrificing any quality of the finished radiograph. We have filters, masks, cones, and for body-section radiography, there is the "multi-section cassette" (which I described some time ago). All these aids used at the right time, and in the right place will add quality to the finished radiograph, and will reduce the amount of radiation reaching our patient. I would repeat the suggested resolution for the consideration of all technicians—We resolve to obtain the maximum amount of information while using the minimum amount of radiation. I trust all members of the team will seek every possible way to arrive at such a conclusion.

To summarize, I repeat my conviction —My occupation is a wonderful aid to the health of my fellow man. I believe my occupation will be entirely free from any hazard if all members of the medical team use every means to improve their individual efficiency, and strive for perfect coherence when seeking a diagnosis through the medium of x-ray.

LA CELLULE PHOTO-ELECTRIQUE EN TECHNIQUE RADIOGRAPHIQUE

Par: Adrien Jobin, R.T., Hôpital Hotel-Dieu, Québec

DEPUIS plus de 6 ans je travaille avec cette ampoule électronique et je puis vous dire, qu'elle et moi, nous sommes une bonne paire d'amis.

Comme vous le savez deux métaux au moins: le césium et le sélénium ont la propriété d'émettre des électrons sous l'influence d'une source lumineuse. Le césium donne le maximum d'émission à la lumière jaune tandis que le sélénium est plutôt influencé à la lumière rouge.

Il y a dix ans certains expérimentateurs ont avantageusement exploité cette propriété photo-électrique en lui trouvant des applications tant industrielles que scientifiques. Tous, vous connaissez, les portes automatiques, les signaux lumineux automatiques enfin l'exposition contrôlée dans le domaine des rayons-x, le domaine qui nous concerne plus spécialement et dont je voudrais vous entretenir aujourd'hui.

Electroniquement, le système photo-électrique comprend quatre parties:

1. Une ampoule photo-électrique. 2. Un condensateur (à l'huile) de minutage. 3. Un thyrathron. 4. Un relais.

L' ampoule photo-électrique a une cathode photo-sensitive, c'est-à-dire que la cathode émet des électrons à l'instant où un rayon la frappe. L'émission de la cathode est en proportion de l'intensité de la lumière, c'est-à-dire, que plus intense est la lumière plus grand sera le nombre d'électrons libérés par la cathode. Ces électrons sont attirés par l'anode et ceux-ci font le travail désiré. Une simple émission d'électrons produite par la cathode est amplifiée jusqu'à 100,000 fois.

Le condensateur: Le condensateur se compose toujours de deux plaques et d'une substance isolante ou diélectrique. C'est le condensateur d'un type conventionnel.

Le thyrathron: Le thyratron fait le même travail qu'un commutateur manuel soit pour fermer ou ouvrir le circuit. C'est généralement une ampoule à gaz à trois électrodes qui a la propriété de faire passer le courant entre la cathode et l'anode, si un voltage spécifique est appliqué sur sa grille de contrôle.

Le relais: Le relais est une pièce électro-mécanique qui est composé:

1. D'un enroulement de fil de cuivre autour d'un noyau de fer doux.

2. D'une armature mobile munie d'un contact.

3. D'un support fixe avec un second contact.

Son fonctionnement: Lorsqu'un courant électrique passe dans le thyratron et dans la bobine du relais, les pointes de contact s'ouvrent mettant fin à l'exposition.

Le disque obturateur: Ce détail de l'appareil ne serait pas complet sans inclure le disque d'ouverture du Bucky qui est très important. Il est construit en aluminium et plomb, avec des ouvertures disposées d'une façon géométrique (tel qu'indiqué). Ces ouvertures permettent à la cellule de ne voir qu'une partie prédéterminée de chaque région à radiographier avant que le rayon-x vienne frapper sur le petit écran fluoroscopique situé dans un chambre noire. Les trous obturateurs du disque sont employés suivant la région anatomique intéressée au moment de la radiographie. De ces trois ouvertures possibles celle avec quatre trous elleptiques est la plus importante. Elle est employée pour plusieurs régions du corps. Cependant quand un minutage photo-électrique de parties anatomiques petites est indiqué, l'ouverture à un trou (de 1¾ po. carré) est employée afin que la cellule ait un champ de vision plus restreint. Si la grande ouverture était employée dans le cas indiqué ici trop de

lumière serait produite à la cellule et l'exposition se terminerait trop tôt résultant en un film trop pâle.

L'ouverture à 16 trous et mesurant (4½ po. carrés) est très importante pour la radiographie de grandes surfaces contenant des tissus opaques et non opaques mélangés. Les examens typiques de ceci sont les examens gastro-intestinaux, le bassin et l'abdomen. L'emploi de l'ouverture à seize trous permet à la cellule d'intégrer la radiation-x passant à travers de grandes surfaces et par conséquent, réduit l'effet des gaz, des os ou un état pathologique qui pourraient avoir le résultat final de la radiographie. Il est apparent que l'ouverture à 1 trou, de même que 4 trous peuvent voir dans cer tains cas, seulement des os ou des tissus mous et, par conséquent, ne pas donner une moyenne pour la surface en considération.

Il est essentiel que les techniciens reconnaissent l'importance du disque obturateur car ils comprendront alors la nécessité de placer le patient avec précision sur la table radiographique afin de contrôler la durée exacte de l'exposition puisque la cellule photo-électrique doit voir seulement la partie à radiographier. Il est évident que le patient doit être placé sur la table de façon à ce que la région examinée soit exactement au-dessus de l'ouverture du disque obturateur.

La radiation-x pénètre alors le patient, le dessus de la table, la cassette dans laquelle est placé le film et sort en arrière de la cassette (les cassettes pour cellule photo-électrique ne sont pas plombées) pour aller frapper un écran fluorescent et produire une lumière jaune teintée verte. Voilà la raison pour laquelle le césium est employé dans l'ampoule photo-électrique puisque l'écran fluoroscopique émet de la lumière jaune. L'énergie reçue en lumière par la cellule est alors convertie par celle-ci en énergie électrique qui est envoyée comme signal d'arrêt au circuit de contrôle.

Il y a donc plusieurs conditions à remplir pour obtenir de bons clichés avec cellules. 1. Un bon centrage du patient sur la cellule.

2. L'emploi du Bucky.

3. Ajuster le K.V. prescrit par la charte.

4. Une bonne calibration de l'appareil.

Les avantages:

1. Avec un appareil équipé de cellule photo-électrique le technicien n'a pas à calculer une quantité de facteurs techniques et peut concentrer son travail sur les positions à employer qu'il désire le plus perfectionner.

2. N'a plus besoin de mesurer, ni déterminer le Mas.

3. Nous avons des films de densité plus égale même pour les patients décalcifiés, ou très obèses et par le fait même moins de reprises, donc économie de temps et de matériel employé.

4. De plus la cellule est employée à bon escient pour les malades mentaux et les enfants de 5 ans et moins.

5. La cellule nous est d'un grand secours pour les patients porteurs de plâtre à l'épaule, à la colonne et à la hanche, dont l'épaisseur et la densité sont difficiles à déterminer.

6. De plus lorsque nous devons varier la distance, la cellule augmente automatiquement le temps d'exposition sans que la qualité du film en soit affectée.

Comme vous le voyez la cellule photo-électrique ne réduit en rien la compétence requise par le technicien; au contraire, elle augmente même sa responsabilité. En employant la cellule, le technicien peut concentrer une plus grande attention sur le patient et sa position précise sur la table. De plus le technicien doit avoir une connaissance approfondie de l'anatomie, afin de tirer le maximum d'avantages fourni par le système photo-électrique.

La cellule photo-électrique est donc un actif précieux à notre disposition pour réaliser les meilleures radiographies avec les appareils à R.X. à notre usage.

THE PHOTO-ELECTRIC CELL IN RADIOGRAPHY

By Adrien Jobin, R.T., Hotel Dieu Hospital, Quebec)
Translated from the French by Jane Martin, R.T.

FOR more than six years I have worked with a photo-electric cell and we have become good friends, I can tell you.

As you know, at least two metals, cesium and selenium, have the ability to emit electrons when exposed to light. Cesium gives its maximum emission under yellow light, while selenium is influenced by red light.

Ten years ago certain research workers took advantage of this photo-electric property, finding applications for it which were industrial as well as scientific. You are all familiar with these, particularly automatic doors, automatic light signals, and finally exposure control in the domain of x-rays, the domain which particularly concerns us, and which I would like to discuss.

Electronically, the photo-electric system consists of four parts: 1. A photo-electric tube; 2. a small oil condenser; 3. a thyratron; 4. a relay.

The photo-electric tube has a photo-sensitive cathode; that is, the cathode emits electrons the instant a ray of light strikes it. The cathode emission is in proportion to the intensity; in other words, the more intense the light, the greater the number of electrons liberated by the cathode. These electrons are attracted by the anode and do the desired work. A single emission of electrons produced by the cathode is amplified 100,000 times.

The condenser is always composed of two plates, and an insulating substance or dielectric. This is the conventional form of condenser.

The thyratron does the same work as a hand lever would; closing and opening the circuit. It is usually a gas filled tube, with three elements, which permits current to pass from the cathode to the anode if a specific voltage is applied to its control grid.

The relay is an electro-mechanical device consisting of:

1. A coil of copper wire wound on a soft iron core.

2. A moveable armature bearing a contact.

3. A fixed support bearing a second contact.

The function of the relay: when an electric current passes through the thyratron and into the relay coil, the contacts open, ending the exposure.

The scanning disc: A description of the apparatus would not be complete without including the Bucky scanning disc, which is very important. It is composed of aluminum and lead, with apertures arranged in a geometric pattern. These apertures permit the cell to be exposed only to a pre-determined part of each area to be radiographed, and through the apertures the x-rays strike the small fluorescent screen enclosed in a light-tight box. The scanning holes of the disc conform to the anatomy of the region being radiographed. Of the three available openings, the most important is that with four elliptical holes. It is used for several parts of the body. However, when a minute photo-electric reading is required for small anatomical areas, the disc with one hole, one and three-quarter inches square is used, so that the cell is limited to a smaller field. If the large hole were used in such a case too much light would be produced by the cell, and the exposure would be terminated too soon, producing too light a film.

The disc with sixteen holes measuring four and one-half inches square, is very important for radiography of large areas containing both opaque and non-opaque tissues. Typical examinations include the gastro-intestinal tract, the pelvis, and the abdomen. The disc with sixteen holes permits the cell to average out the radiation passing through large areas, and consequently reduces the effects of gas, bone, or pathological conditions which would influence the resulting radiograph. It is obvious that the disc with one hole, or even with four holes, would only, in certain cases, expose bone or soft tissues and thus not provide an average exposure of the area under examination.

It is essential that technicians recognize the importance of the scanning disc. They will then understand the necessity for positioning the patient accurately on the x-ray table, and thus controlling the exact duration of exposure, since the photo-electric cell should "see" only the part to be radiographed. It is evident that the patient should be placed on the table so that the area being examined is directly above the opening of the scanning disc.

Thus, x-radiation penetrates the patient, the top of the table, the cassette containing the film, and emerges from the back of the cassette (cassettes used with the photo-electric cell are not leaded) to strike a fluorescent screen and produce a greenish-yellow light. This is why cesium is used in a photo-electric cell, as a fluoroscopic screen emits yellow light. The energy received as light by the cell is then transformed by it into electrical energy which is sent as a stop-signal to the control circuit.

There are several conditions to fulfil to obtain good exposures with cells:

1. Accurate centering of the patient over the cell.
2. Use of the Bucky.
3. Adjustment of Kv prescribed by the chart.
4. Accurate calibration of equipment.

Advantages:

1. With apparatus equipped with a photo-electric cell the technician does not have to calculate a number of technical factors, and can concentrate his efforts on the positions he most desires to perfect.

2. There is no need to measure the patient, or to determine the MAS.

3. We obtain films of more equal density, even with decalcified or very obese patients, and by the same token, have less retakes, thus saving time and materials.

4. Furthermore, the cell can be used with confidence with mentally-ill patients, and for children five years and under.

5. The cell is a great help to us with patients in plaster on shoulder, spine, or hip, where the thickness and density are difficult to assess.

6. Moreover, when we must increase distance, the cell automatically increases the time of exposure, without affecting the quality of the film.

As you see, the photo-electric cell in no way lessens the competence required of a technician; on the contrary, it even increases his responsibility. In using the cell, the technician can concentrate greater attention on the patient and his exact position on the table. Furthermore, the technician should have a thorough knowledge of anatomy in order to gain the greatest advantages supplied by the photo-electric cell.

Thus the photo-electric cell is a valuable tool at our disposal, to produce the best radiographs with the x-ray equipment we use.

ARTHROGRAPHY OF THE KNEE JOINT IN THE PRIVATE OFFICE

By Thomas J. Patry, R.T., London, Ontario

CONTRAST visualization of the internal structures of the knee joint has become a routine procedure in a number of medical centres throughout the world. This procedure is generally carried out in a hospital; however, during the past eight years, it has been established that it can be satisfactorily performed in a private radiological office.

By observing the simple principles of asepsis, arthrography can be performed in the private office with little risk, discomfort or time loss to the patient so that it is now considered in the same category as other special procedures such as the G.I. Series, Barium Enema or Intravenous Pyelogram.

As a preliminary, the patient is instructed to prepare the area to be examined the night prior to the examination. This preparation includes—

1. Washing the area well with soap and water.
2. Shaving all hair from the area, 8-10 inches above and below the joint line.
3. Washing the area again with soap and water.
4. Wrapping the entire area with 3-inch gauze bandage.
5. Soaking this well with alcohol.
6. Wrapping a clean band or bath towel around the bandage.

Leaving this dressing on all night.

The dressing is removed in the office by the nurse just prior to further sterilizing the area with iodine and alcohol.

A local anaesthetic, generally 2 c.c., is injected into the skin, subcutaneous tissues and into the joint itself. Following this, excess fluid, if present, is aspirated and a record made of the quantity and quality.

The procedure of vacuolization is mentioned only to state that it is no longer used.

The usual procedure in our office is to use air, filtered through sterile water. Some doctors prefer to use alcohol for sterilization. Oxygen is used at times in place of filtered air.

When the referring doctor suspects a tear of the lateral meniscus, the radiologist may elect to inject Diodrast first, followed by aspiration of residual Diodrast and replacing it with air, thus providing a double contrast method with little additional time or effort being required.

Filtered air is obtained by aspirating the air through a Vacoliter containing sterile water. The apparatus used is quite

Fig. 1. Filter for Air.

simple, is easily assembled, and has served the purpose well. (Figure 1 illustrates the assembled apparatus.) 40-60 c.c. of air are usually sufficient for the purpose

Presented at the 2nd International Convention, Washington, D.C., June, 1957.

of filling the joint space. When Diodrast or some other opaque material is used, 20-30 c.c. are adequate.

The needle puncture in the skin is sealed with collodion and the location of the knee joint space is marked on the skin surface. The knee is then manipulated to spread the injected material throughout the joint.

Films are secured in the postero-anterior position with the knee in internal rotation, neutral position and external rotation.

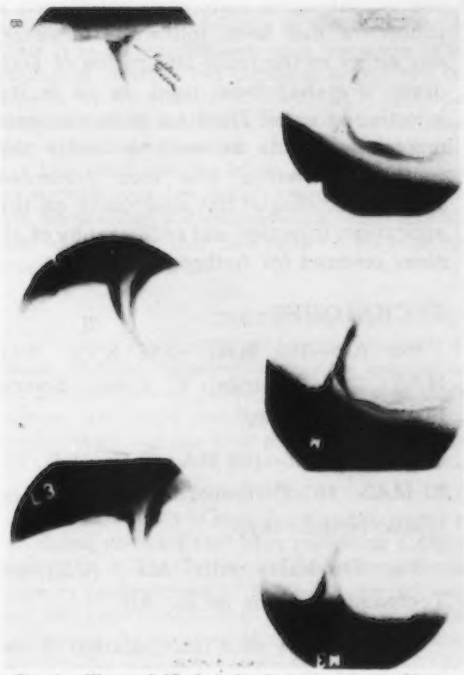


Fig. 2. Views of Menisci showing sequence marking.

The sequence of exposures of the medial meniscus is designated by the letters M.1, M.2, M.3, and of the lateral meniscus, L.1, L.2, L.3, corresponding to the positions mentioned. (Figure 2.)

Manual manipulation, forced abduction and adduction, is always applied to the knee (Figure 3) when using a non-opaque medium as this allows the injected material to surround and outline the menisci. No manipulation is used when an opaque substance has been injected.

Fig. 3. Manual manipulation of the knee joint.

In our experience, it has been evident that pathology can be visualized by using either non-opaque, opaque or a combination of both materials. It has also been evident that, in our hands, the use of a non-opaque medium reveals a greater degree and extent of pathology than the opaque medium alone, but to a slightly lesser degree than the combined use of opaque and non-opaque materials.

The value of the combined procedure is most apparent in suspected injuries to the lateral meniscus which is not always shown too clearly with non-opaque substances alone. This double-contrast technique further accentuates the outline of the menisci by leaving a thin coating of Diodrast over the surfaces which produces almost a relief pattern and accentuates any pathology which might be present. (Figure 4.)

On occasions, Diodrast will first be used and if no abnormalities are found on a preliminary review of the films, then, with little additional preparation, the field

having been kept clean, an injection of non-opaque material can be carried out.

Fig. 4. Double contrast technique.

In summing up, then, there are three possible procedures which we may use in the office—

1. Routine, with filtered air.
2. Diodrast alone.
3. Diodrast, followed by air.

The radiologist makes his decision at the time, based on the history provided by the referring doctor and/or the patient. Our experience has taught us that when there is a possibility of a questionable result being obtained with non-opaque material, it is advisable to begin with an opaque medium first, then follow it with the non-opaque medium, thus avoiding a confusing result in which air bubbles are interspersed with opaque material.

In our office, the radiologist prefers manual manipulation of the joint (though apparatus for mechanical manipulation has been constructed by him) and he states that positions and results are better when done by hand.

Office procedure may be carried out either as indicated in the preceding discussion or the referring doctor may wish to do the injection and then send the patient for x-rays. Early in our experience, some cases were seen after such a procedure had been followed; however, due either to the rapid absorption of Diodrast, if it had been used, or to faulty injection of either Diodrast or non-opaque material—outside as well as inside the joint—this method was soon discarded and the radiologist has now taken on the aspiration, injection and radiography of all cases referred for Arthrography.

TECHNIQUES

For Air—100 MA; 40-45 KVP; 8-12 MAS; 26″ Distance; 8″ Cone; Screen Films; Non-Bucky.

For Diodrast—100 MA; 46-50 KVP; 15-20 MAS; 40″ Distance; 8″ Cone; Screen Films; Non-Bucky.

For Diodrast with Air — (Contrast Technique)—Some as for Air.

For the views with manipulation of the knee joint, the x-ray tube is angled approximately 4 degrees caudad and the central ray is projected tangentially through the joint space.

From 1947 to Dec. 1956, we have done 161 cases in our office.

So far there have been no reported problems after arthrography.

The Focal Spot

Journal of the Canadian Society of Radiological Technicians

"All our ambitions should be devoted to a faithful fulfilment of duties towards others as well as to ourselves."—Roentgen.

LESLIE J. CARTWRIGHT, R.T.
EDITOR

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Editorial Notes

SURVEY OF X-RAY TECHNICAL EDUCATIONAL FACILITIES IN CANADA

In this issue we are privileged to present the first portion of a comprehensive survey on radiologic technical education in Canada; Part 2 will appear in the following issue. Sister Rita Clare is to be congratulated upon the scope of her survey which must have involved a tremendous amount of research and correspondence. We feel that this paper will rank with that of Sister deLellis on the History of the C.S.R.T. (published in *The Focal Spot* October 1948 and January 1949), as important works of reference for those interested in x-ray technology in Canada. It should also aid in locating training centres for prospective students.

This paper will, we know, be read with interest by the active R.T.'s in our Society. However, we strongly urge our student technicians not to skip these pages but to carefully peruse and appreciate the unselfish and arduous work which has been done by many of their predecessors to give them the facilities they have to-day. We hope such reading will inspire them to help with continued progress for the future.

CERTIFICATION OF THERAPY TECHNICIANS

The five years' experience period necessary for a Therapy Technician to be eligible for Certification Without Examination may be counted up to the end of the present year, 1957, instead of the previous date of January, 1956. Would any member who knows of any technician engaged in therapy, who might now be eligible for registration, as the result of the extended period, please contact them and ask them to apply to their Provincial Secretaries.

DIGESTS FROM "FOCAL SPOT" PUBLISHED IN ENGLAND

It is of interest to note that "Radiography," the Journal of the British Society of Radiographers, has during the past year been publishing a digest of articles in *The Focal Spot*, together with those from "The X-Ray Technician" and other journals. In some instances as much as two pages was given to condensations of articles in our journal. As Editor we appreciate this widened publicity and our contributors—and prospective contributors—will note that their work receives attention far beyond the confines of their native country.

CROSSWORD PUZZLES AS AN EDUCATIONAL MEDIUM

In this issue we publish a radiographic crossword puzzle. We are indebted to Mr. Arnold Moen, R.T., Editor of Stereoscoop, the Journal of the Washington (State) Society of X-Ray Technicians, in which journal we first noticed these puzzles. Mr. Moen very kindly sent along several hitherto unpublished puzzles which we hope to print in subsequent issues of *The Focal Spot*.

The interesting feature of these puzzles is that they were made by student technicians in the School of X-Ray Technology, Providence Hospital, Seattle, as part of their training. Constructing a crossword puzzle seemed rather a tough assignment for anyone, let alone a student, so we enquired further and Mr. Moen referred our letter to Mr. B. Douglas Walker, R.T., Chief Technician at Providence Hospital, who is in charge of technical training at that institution. Mr.

EDITORIAL NOTES

Walker's account of the origin of the idea is as follows: "Shortly after I started at Providence I found one of the students was a 'crossword puzzle addict.' My warnings apparently didn't make much impression because I caught her working one while her work piled up. I told her if she liked puzzles that well she could make one using only terms used in x-ray technology. I can't say I was the most popular person around there for a while but the puzzle books disappeared from the department almost immediately." However this was the genesis of the idea of adding crosswords to the training. Mr. Walker made mimeographed forms of fifteen squares each way. He continues: "I use them as a training aid especially during the students' first few months of training. Usually I hand out the blanks after about one month of training and at the same time give them several booklets containing vocabulary. The student makes up the puzzle by trial and error so that no two are exactly alike. I use them for part of the 'homework' required of the students. At present the puzzles are accepted as part of the programme. The new group even asked when they would get theirs." It would appear that this idea could be usefully adopted in Canadian Schools of X-Ray Technology. Incidentally a useful radiological dictionary "Roentgenographic Anatomical Terminology" by J. F. Roderick, R.T., may be obtained free of charge by writing E. I. Du Pont de Nemours & Co. Inc., Photo Products Department, Wilmington 98, Delaware. Lists of prefixes and suffixes, useful as fillers, may be found, together with a wealth of other terms in Mallett's "Anatomy and Physiology for X-Ray Tecchnicians."

NEXT NATIONAL CONVENTION WINNIPEG, JUNE 17th-20th

The Manitoba members are already busy on plans for the next C.S.R.T. Convention and the rest of us will soon have to start thinking about it In fact those intending to present papers should be working on them now. The Convention will be held at the Fort Garry Hotel June 17th to 20th with registration starting on the 16th. The General Chairman is Desmond Butler, R.T., 116 Medical Arts Building, Winnipeg. Correspondence regarding papers and exhibits should go to Miss M. Steski, R.T., Department of Radiology, Winnipeg Clinic. The Publicity Chairman is Mr. J. Enns, R.T., The Children's Hospital, Winnipeg.

We noticed that one of the stewardesses on the Royal plane was from Victoria, B.C., and was stated to have been originally a radiographer. We would like to think that the C.S.R.T. had a representative on the plane—but we don't know.

CO-OPERATION ASKED TO KEEP LIST OF STUDENT TRAINING FACILITIES UP-TO-DATE

We suggest that members check the list of schools compiled by Sister Rita Clare on pages 200-1 (which was assembled about a year ago) and send the Editor particulars of others which have started since or were not included in the original list. As far as possible give the same details as in the Table. We can then publish a supplementary list for the guidance of those interested in student training. We feel that this would be valuable and urge readers to DO IT NOW while they think of it.

1957 CONVENTION MOVIES

The 16mm Kodachrome motion pictures depicting the activities occurring during the Second International Convention of X-Ray Technicians in Washington, D.C., are now available for showing to Provincial groups. The film is 1,600 feet in length and has a running time of approximately 50 minutes.

Programme Chairmen may secure this film for projection by writing to:

Canadian Kodak Sales Limited,
Sales Department.
Attention: Mrs. D. Easby,
Toronto 9, Ontario, Canada.

When making a booking, please state the date that the film is to be shown and the name and address of the person to whom it is to be shipped. The Canadian Kodak Technical Representative can also arrange bookings if that is more convenient.

A Survey of Educational Facilities in Canada For Radiological Technicians

By SISTER RITA CLARE, R.N., R.T., B.Sc.
Halifax Infirmary, Nova Scotia

PART I.

Interest in the advancement of educational facilities for radiologic technicians in Canada has increased within recent years. A sound and practical system of two-year programs was revealed through this 1956 survey, which also indicated the need of instructors prepared on the collegiate level.

INTRODUCTION

ONE of the outstanding needs to-day in is adequate instruction and preparation education, relative to good patient care. of radiologic technologists. This much needed education on a high plane can only be obtained through good schools having a highly qualified instructional staff. Perfect schools, according to Pius XI, depend more upon good teachers than upon the methods of instruction used.[40] Educators interested in the development of radiologic technologists were early cognizant of this fact. Petrie, in 1948, stated the need of well organized instruction by competent teachers and recommended the development of standardized courses in this field.[28] The Canadian Association of Radiologists and the Canadian Society of Radiological Technicians subsequently co-operated in the publication of the *Instructors' Curriculum*.[43]

The responsibility of the education of radiologic technologists has not always been fully recognized by directors of schools and hospital administrators; however current interest is steadily on the increase. The science of radiology is comparatively young and new problems are continually being presented. Modern education makes great demands on leaders in this field, including the education of radiologic technologists. The need must be met through a staff of properly qualified instructors as the faculty of schools. According to Mallett, the inspection and accrediting of hospitals for teaching radiologic technology, with emphasis on a properly trained and supervised teaching staff, would do much to overcome the present inadequacy in the teaching of students.[52] The problem of adequate instructional facilities presents a definite challenge to interested educators, especially to the directors of schools.

Thesis presented to the faculty of the School of Nursing of Saint Louis University in partial fulfillment of the requirements for the degree of bachelor of science in radiologic technology.

The research project was carried out under the direction of Sister Mary Alacoque Anger, Assistant Professor and Director of the Curriculum in Radiologic Technology, Saint Louis University.

Purpose of the Study

A desire to obtain definite information regarding existing educational facilities in Canada for radiologic technologists prompted the writer to conduct the survey presented in this thesis. A similar study of existing facilities in the United States was made in 1955,[11] and it is hoped that the two studies will provide a fair evaluation of existing educational facilities for radiologic technologists in North America.

Method of Procedure and Source of Data

The research method was used and questionnaires were sent to 112 schools of radiologic technology. Fourteen colleges and universities were contacted. Additional material was obtained through a review of current literature and by personal communication with educators in radiologic technology in Canada and the United States.

The research project was carried out under the direction of Sister Mary Alacoque Anger, S.S.M., who gave valuable assistance in the preparation of this thesis.

CHAPTER I
HISTORICAL BACKGROUND

In his simple laboratory in Würzburg, Germany, Wilhelm Conrad Roentgen discovered the x-ray. A number of versions of the story of Roentgen's discovery, in 1895, have been offered and sometimes writers attribute the discovery to chance or to accident. This discovery, however, was truly the result of sincere and keen scientific investigation. For many years Roentgen had been interested in specific experiments in physics and apparently had deliberately covered the Crookes tube he was using, obliterating from direct vision all "the then known phenomena of the excited vacuum tube," as described by Percy Ghent.[10] The same author states:

> In one strikingly apt and arresting sentence, the writer of an editorial appearing in the Journal of Roentgenology, shortly after the discoverer's death, thus sums up Roentgen's title to the gratitude and admiration of his fellow men:
>
> "The flash of the fluorescent cardboard had to be answered by a flash of genius, and the rest was merely a matter of detail."
>
> Roentgen, to his eternal honor, supplied that divine spark—and it set the scientific world on fire.

The possibility of using the x-ray in the diagnosis of disease was early recognized and many articles on the new ray were published within the first year of its discovery. Glasser refers to an editorial in *The Journal of the American Medical Association*, in February, 1896, in which the possible therapeutic application of the new rays had been put forth.[1]

A hundred years have not yet passed since this amazing discovery, and the new science of radiology born in 1895, has made rapid and progressive strides. Significant among the advances has been the development of the technical workers who assist the radiologist.

Educational Development

The first quarter of the twentieth century afforded no formal education in any part of the world for technical workers in the field of radiology. This fact is obviously due to the then limited available knowledge of the new ray.

Early Period

World War I brought a realization of the potentialities and the practical application of the roentgen ray in medicine. Prior to this time all technical work was carried on either by physicists or personally by physicians interested in the work. Specialists in this field were at that time practically unknown; however, the advent of the First World War brought the development of schools for radiologists. The tremendous number of war casualties, as well as widespread epidemics, soon made necessary the use of inductees of the military personnel to aid the radiologist in the technical aspect of the work.[11] Many of these technical assistants, upon release from military service, continued this type of work, either as independent workers or as assistants in the offices of radiologists or in hospitals. Experiences varied throughout the country with no form of education except that which the radiologist had time to give to his individual helper.[3] The obvious need of ethical standards and further education for this new group of professional workers was soon recognized both by radiologists and leading technicians.

The Formation of Technical Organizations

National societies for radiologic technologists had been established in the United States and in England in 1920; these societies were sponsored by radiologists. Technicians in Canada had become registered with the American Society of X-Ray Technicians when it was organized,[8] and there was an evident need of organization in Canada.

The oldest society in Canada, the Manitoba Society of X-Ray Technicians, organized in 1929, first affiliated with the American Society of X-Ray Technicians.[36] In 1935, the Ontario Society was formed and four years later published the first edition of its official journal, *The Ontario Radiographer*, which contained many excellent technical articles. This society early advocated the need and value of organized training for its students.

Plans were soon formulated for a Dominion organization. These plans became a reality in 1942 and at this time Mary Cameron in a report as Secretary of the newly formed Canadian Society of Radiological Technicians stated at the first meeting of the board of directors:

> Each annual meeting of the Ontario Society of Radiographers since May, 1937, has been the occasion for proposals, discussions and reports, concerning the formation of a Canadian Society of Radiological Technicians. This year, through the sustained effort of those who first turned the soil for

such an organization and those who now strive to cultivate it, we present the report of an actively functioning society, 380 members strong.[15]

The Ontario Radiographer, official journal of the Ontario Society of Radiographers, was discontinued in favor of *The Focal Spot*, which became the official publication of the Canadian Society of Radiological Technicians. In 1943, the final charter for the Canadian Society of Radiological Technicians was granted.[8] At the first annual meeting in Toronto in 1943, plans were formulated for the educational standards of members of the Society. A minimum of two years of training was approved.[15]

A crest and motto were adopted for the Society. The crest has a maple leaf as a background with an x-ray tube in the centre, underneath this design are the words of the motto, *Scientia et Mores*. The adopted emblem and motto were beautifuly described by Sister Edmund Campion at the first international convention of x-ray technicians. This author also points out, however, that the ideals of any organization must be put into practice by the members of the organization if the aims for which the crest and motto stand are to be of significant value.[6]

The membership in the Society has grown, since its inception in 1943, from 380 members to 1,022 in the 1956 Registry.[31]

Present Trends

Since one of the objectives of the Society is "To promote and encourage the science and art of Radiological Technique and to consider and discuss all subjects affecting it,"[42] it is natural that the problem of education has received a great deal of attention. Examining boards were established, examinations were given; however, one report reveals that a high percentage of technicians at that time lacked an adequate knowledge of the physical principles involved in radiograhy or therapy.[27]

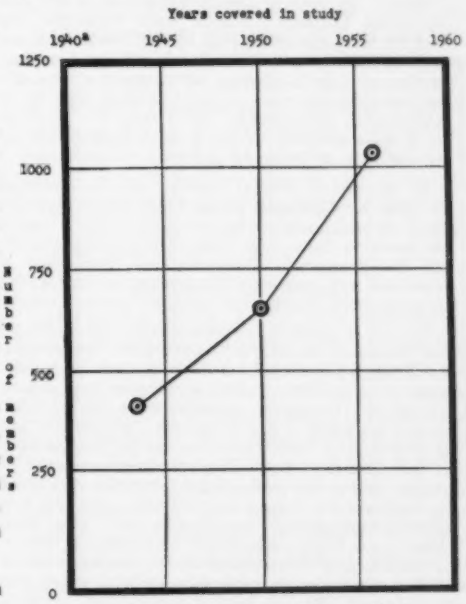
In 1948, Burke stressed the need for improved training and disapproved of reimbursing a student technician after a mere three month period of training.[5] The need for an organized and standardized curriculum acceptable to all member societies is mentioned in a 1950 report of the examining board.[23]

As chairman of the Canadian Association of Radiologists Committee on Technician Training, Petrie reports in 1951, on the Dominion organization:

> Growth has been remarkable and there are now over 650 members, all fully qualified techniciens. They have a Dominion charter. They now have representation on the Canadian Hospital Council.
>
> . . . The annual meetings of the Canadian Society of Radiological Technicians are consistently well attended. Ethical and scientific standards are high. The scientific papers are on the whole excellent and the official journal, *The Focal Spot*, is likewise a credit to their society. The society is governed by a board of directors on which the Canadian Medical Association and the Canadian Association of Radiologists are represented.
>
> Actually one of the most difficult problems faced by the technicians has been, and still is, education. . . . The need for a more uniform curriculum has been recognized for a good many years and was, I believe, first pointed out by the late Bert Welch over five years ago.
>
> Even when we have the new curriculum, the problem of securing adequate training for technicians will not be solved.[28]

In this same year, Sister deLellis pointed out that with the introduction of more complicated procedures, the training of technicians must become more thorough.[9]

Table 1 presents data regarding growth of membership since the organization of the Society, and this same growth is shown graphically in Figure 1.



aThe Society was organized in 1943.

Fig. 1.--Increase in membership of the Canadian Society of Radiological Technicians from 1943 to 1956.

TABLE 1
GROWTH IN THE CANADIAIN SOCIETY OF RADIOLOGICAL TECHNICIANS OVER A THIRTEEN-YEAR PERIOD

Year	Membership
1943	380
1950	588
1956	1,022

There had been noticeable failures in therapy and protection, therefore, in order to stimulate interest in the subject of protection, the board of examiners offered a prize for the three best essays on protection from radiation. The response was good, and these essays were subsequently published in *The Focal Spot.*

An *Instructors' Curriculum* was provided by the Society in 1950 as a teaching guide. The following is taken from the "Foreword" of this curriculum, written by the late H. M. Welch; and due to its great significance is quoted at length:

Prior to the formation of the Canadian Society of Radiological Technicians in 1943, the training and examining of students was left to the various provincial societies. This method was not entirely satisfactory and frequently resulted in haphazard training. In 1943 a Central Examining Board and Provincial Examining Boards were appointed, the examination papers being set by the Provincial Board and submitted to the Central Board for approval. While this was a marked improvement it was still not the ultimate aim of the Canadian Society of Radiological Technicians. There was still found to be a wide variation in the type of examination set by the various Provincial Boards.

At the second annual meeting held in Winnipeg in 1944 the Chairman of the Examining Board, Dr. M. C. Morrison, expressed the opinion that it would be better to have some form of standardization for all the Provinces. Following this suggestion a resolution was passed at this meeting which resulted in a standard examination being set across Canada.

In 1946 a syllabus of training was published by the Canadian Society of Radiological Technicians, this being a brief outline of the subjects to be taught. Later in July, 1948, another curriculum was drawn up by the Canadian Association of Radiologists. During the whole of this period the Canadian Society of Radiological Technicians had the full co-operation of the Canadian Association of Radiologists. It is largely due to the work of this committee appointed by the Canadian Association of Radiologists that this more comprehensive curriculum is now being published, after being accepted by the Canadian Society of Radiological Technicians at the annual meeting held in Vancouver in September, 1950. It is felt that the lecturers will now have a well-defined teaching syllabus to work from and the students will be assured that the examinations they are to take will be strictly on this curriculum.[43]

The official list of textbooks has been enriched by *A Handbook of Anatomy and Physiology for X-Ray Technicians* by Mallet. [2, 24] A recent issue of *The X-Ray Technician* carries a study guide for this text.[13] Reciprocity has been established between the Canadian Society of Radiological Technicians and the American Registry of X-Ray Technicians, as well as with the British Society of Radiographers.

The ever present problem of approval of training schools in Canada was postponed to such time as the Canadian Society of Radiological Technicians is able to set up standards of its own for such schools. Until official approval of schools is established the following list, published in 1953, was suggested as a guide to the unofficially approved schools.[1]

ALBERTA: At Calgary—The General Hospital. The Colonel Belcher Hospital. The Radium and X-Ray Institute.

BRITISH COLUMBIAI: Vancouver—The General Hospital, Saint Paul's Hospital, Shaughnessy Military Hospital.

MANITOBA: St. Boniface—St. Boniface Hospital. Winnipeg—The General Hospital, Deer Lodge Military Hospital.

NEW BRUNSWICK: Saint John—St. Joseph's Hospital.

NOVA SCOTIA: Halifax—The Halifax Infirmary. Antigonish—St. Martha's Hospital.

ONTARIO: Chatham—General Hospital.
Hamilton—General Hospital.
Cornwall—Hotel Dieu Hospital.
Ottawa—General Hospital.
Toronto—University of Toronto (with several participating hospitals).
London—University of Western Ontario (with several participating hospitals).

QUEBEC: Montreal—The Royal Victoria Hospital and several hospitals that are participating in a well organized training programme.

SASKATCHEWAN: Moose Jaw—The General Hospital, The Providence Hospital.
Prince Albert—The Holy Family Hospital. The Victoria Hospital.
Regina—The General Hospital, The Grey Nuns' Hospital, The Medical Arts Clinic.
Saskatoon—The City Hospital, St. Paul's Hospital.
Swift Current—The Union Hospital.[39]

Undoubtedly there are a number of good schools at the present time which do not appear on this 1953 list.

At the annual meeting of the Canadian Association of Radiologists in January, 1954, a recommendation was passed that the training and examinations of technicians be changed in order to certify the registrant either in diagnostic radiography or therapy, or in both areas.[19] Since that time this

objective has been attained and will be discussed more fully in a following chapter.

In delivering the Welch Memorial Lecture, at the first international meeting of the American Society of X-Ray Technicians and the Canadian Society of Radiological Technicians, Petrie summed up present trends by showing the accomplishments of both societies in the education of technicians. He pointed out, however, that college education should be established in more centres and be available especially for leaders. He also stressed the fact that only in a department where the senior technician has had education on the university level should teaching be attempted. Emphasis was placed on the fact that much of the so-called teaching still carried on is not far beyond the old apprenticeship method, long since discarded in the education of other professional groups. The same speaker also pointed out that in some cases adequate libraries were not provided for technicians.[12] The general trend as of to-day is one of improving facilities for the education of technicians and the establishment of higher standards.

The fourteenth annual meeting of the Canadian Society of Radiological Technicians was held August 29th to September 1st, 1956. At this meeting a report from Dr. E. A. Petrie, chairman of the committee on technical training for the Canadian Association of Radiologists, was read. This excellent report incorporated suggestions on the requirements for approved schools. These proposals appear in the published report of a recent issue of *The Focal Spot*.[30] This issue of the Journal also carries a suggested application form that can be used by schools seeking approval.[33]

Stirling and other members of the Technical Training Committee reported that it will take some time for the suggested changes to be put into effect, and schools will be given time to conform to new regulations.[34]

CHAPTER II
SURVEY OF EDUCATIONAL FACILITIES

A keen interest has been manifested throughout the years in the advancement of the education of radiologic technologists in Canada, both by prominent radiologists and leading technicians. Much has been done to further this objective, especially through the establishment of schools; however, it is felt that not all of the training centres are included in the last available list of tentatively approved schools. Lack of adequate published material has influenced the writer to undertake within the past year a study of present facilities in Canada for the education of radiologic technicians.

Purpose of the Survey

In making the survey, several objectives were kept in mind: the number of schools currently in operation; the direction and supervision of the schools; the number and qualifications of the instructors; the number of students admitted each year; and collegiate or non-collegiate programmes. It is hoped that this study of the general educational status of x-ray technicians in Canada will be of value, not only to Canadians, but also will serve as a complement to a similar survey published in 1956 of facilities in the United States,[11] thus providing information in reference to both countries.

Methods Employed in the Survey

Letters were written to the various secretaries of the provincial societies of the Canadian Society of Radiological Technicians. These letters requested a list of the centres of training in which education of x-ray technicians was conducted in the particular province. Several cancer institutes and educators throughout Canada were contacted for information pertinent to this subject. From the responses received lists of the centres were compiled; explanatory letters and questionnaires were sent to radiologists in 112 centres and to 14 colleges and universities, to which 89 responses were received.

Results of the Survey

The survey revealed that with five exceptions all schools contacted are conducting courses over a period of two years under the supervision of a qualified radiologist. Junior matriculation is a prerequisite for admission to the status of a student member of the Society, and 24 schools require senior matriculation, while students who have either of these are accepted by two schools. Physics is a specific prerequisite in all schools; however, the senior year of high school physics is specifically required by some of the schools. Chemistry is required in 12 schools; one school requires experience in typewriting; while first aid is required in two other schools

TABLE 2

ANALYSIS OF EDUCATIONAL FACILITIES IN CANADA FOR X-RAY TECHNICIANS

Province	Name of School or University	Location	Year	Educational Prerequisites			Annual Enrollment	Instructors		University Affiliation*	Degree Conferred
				XI	XII	Miscellaneous		Degree Technicians	Other Degrees		
Alberta	General Hospital	Calgary	2	x			6	....	8	....	....
	General Hospital	Edmonton	2		xx	XI Physics	2-3	....	9	....	....
	Misericordia Hospital	Edmonton	2	x		XI Physics	2-4	....	9	....	....
	Royal Alexandra Hospital	Edmonton	2	x			3-4	....	9	....	....
	University Hospital	Edmonton	2	x			4	....	9	....	....
	Lethbridge Munic. Hospital	Lethbridge	2	x			2	....	—	....	....
	St. Michael's Hospital	Lethbridge	2	x		XI Physics	2	....	1	....	....
	Parsons Clinic	Red Deer	2	x		XI Physics	2	1	1	....	....
	St. Joseph's Clinic	Vegreville	2	x			1	....	—	....	....
British Columbia	Burnaby General Hospital	Burnaby	2	x			1	....	—	....	....
	B.C. Cancer Institute	Vancouver	2	x		Registered Nurse	2	1	3	Yes	....
	St. Paul's Hospital	Vancouver	2	x			8-10	....	5	....	....
	Shaughnessy Hospital	Vancouver	3 mos	x			6	....	—	....	....
	Vancouver General Hospital		2	x		XI Physics	10	....	7	Yes	....
	St. Joseph's Hospital	Victoria	2	x			6-7	....	2	....	....
	Royal Jubilee Hospital	Victoria	2	x		4 mos. nursing	3	....	—	....	....
Manitoba	St. Boniface Hospital	St. Boniface	2	x		XI Physics	4-6	....	3	....	....
	Children's Hospital	Winnipeg	2	x			2	....	4	....	....
	Misericordia Hospital	Winnipeg	2		xx		6	....	2	....	....
	Victoria Hospital	Winnipeg	2		xx		2	....	2	....	....
	General Hospital	Winnipeg	2	x			6	....	6	....	....
New Brunswick	Victoria Public Hospital	Fredericton	2	x		Chemistry	2-3	....	1	....	....
	St. Joseph's Hospital	Saint John	2	x			2-5	1	6	....	....
Nova Scotia	Halifax Infirmary	Halifax	2		xx	Chemistry	2-4	1	8	Yes	....
	Mount St. Vincent College	Halifax	4	x			2-3	1	20	....	B.S. in Rt
	Naval Hospital	Halifax	1		xx		6	....	1	....	....
	Victoria General Hospital	Halifax	2	x			10	....	4	....	....
	Aberdeen Hospital	New Glasgow	2		xx		2	....	1	....	....
	City of Sydney Hospital	Sydney	2	x		XI Physics	2	....	1	....	....
	St. Rita Hospital	Sydney	2		xx	XI Physics	3	....	1	....	....

Ontario	St. Vincent de Paul Hospital	Brockville	2	x		First Aid	2	....	1	....	....
	McKellar General Hospital	Fort William	2	x		Chemistry	5	....	—	....	....
	St. Joseph's Hospital	Guelph	3	x			—	—	—	—	—
	MacGregor Clinic	Hamilton	2		xx		2	....	1	....	....
	Hotel Dieu Hospital	Kingston	2		xx	Chemistry	2	....	6	....	....
	Kingston General Hospital	Kingston	2	x	xx	Chemistry	4	....	3	....	....
	Kirkland District Hospital	Kirkland Lake	2		xx	Chemistry	1-2	....	—	....	....
	Ross Memorial Hospital	Lindsay	2		xx	Chemistry	2	....	1	....	....
	Dr. Hill and Others	London	2	x	xx	Chemistry	1	....	4	....	....
	St. Joseph's Hospital	London	2		xx		4	....	4	....	....
	Victoria Hospital	London	2	x			2-4	1	5	....	....
	General Hospital	Niagara Falls	2		xx		0-1	....	1	....	....
	St. Joseph's Hospital	North Bay	2		xx	First Aid	2	....	1	....	....
	Ottawa Civic Hospital	Ottawa	2	x			5	....	2	....	....
	Ottawa General Hospital	Ottawa	2	x			3	....	2	....	....
	St. Joseph's Hospital	Peterborough	2	x			2	....	1	....	....
	General Hospital	Port Colborne	2		xx		1	....	1	....	....
	St. Thomas-Elgin Hospital	St. Thomas	2	x			1	....	—	....	....
	St. Catharines Hospital	St. Catharines	2	x		Chemistry	1-3	....	2	....	....
	Sudbury General Hospital	Sudbury	2	x		Chemistry	4-5	....	2	....	....
	General Hospital	Toronto	1		xx		6	....	6	....	....
	St. Michael's Hospital	Toronto	2	x			5	1	—	....	....
	Sunnybrook Hospital	Toronto	1	x			6	1	9	....	....
	General Hospital	Woodstock	2	x			1	....	1	....	....
Quebec	Associated Hospitals	Montreal	2	x			4	....	8	....	....
	Montreal General Hospital	Montreal	2	x			4	....	5	....	....
	Notre Dame Hospital	Montreal	2		xx		5	1	6	Yes	....
	Radium Institute	Montreal	2		xx		20-30	....	7	....	....
Saskatchewan	Union Hospital	Moose Jaw	2	x		Chemistry	2	....	1	....	....
	Medical Arts Building	Regina	2		xx		3	....	†	Yes	....
	Regina General Hospital	Regina	2		xx	XI Physics	2-3	....	†	Yes	....
	City Hospital	Saskatoon	2		xx	Chemistry	1-2	....	†	Yes	....
	St. Paul's Hospital	Saskatoon	2		xx		2	....	†	Yes	....
	University Hospital	Saskatoon	2	x		XI Physics	—	....	†	Yes	....

* Certain courses are given by universities, but do not necessarily carry college credits.

Key:—x, three years high school; xx, four years high school; —, no response; †, faculty of University of Saskatchewan.

and a four month nursing course in one school. The *Instructors' Curriculum* of the Canadian Society of Radiological Technicians is followed closely by the majority of schools, however, in a few instances some slight deviations were encountered.

Although the admission date varies to some extent, the majority of students are admitted in September. The number of students accepted annually varies from one in the smaller schools to 30 in one of the larger schools.

Radiologists do a great part of the formal teaching, assisted by registered technicians. Of the latter, four have Bachelor of Science degrees, and three hold Bachelor of Arts degrees. Several of the schools take courses in anatomy and in nursing essentials with the school of nursing connected with the particular hospitals. Physicists are members of the teaching staff in 11 hospitals.

One college confers a Bachelor of Science degree in radiologic technology while another had some years ago discontinued a degree granting programme. Several schools of radiologic technology expressed the desire to have affiliations with universities and to participate in a degree programme, while some schools are currently affiliated with colleges and universities.

The number of hours of practical work and theory varies greatly and will be discussed in detail in a later chapter. Thirty-six schools observe a 40-hour week, which includes instruction periods. One school reported a 36-hour week and another a 35-hour week, both including the lecture periods. The question referring to practical experience was unanswered in many instances.

CHAPTER III

PROVINCIAL SOCIETIES AND TRAINING PROGRAMMES

The Canadian Society of Radiological Technicians consists of nine member societies. In the following discussion, the activities of these groups, as revealed by the survey, will be considered in comparison to a report prepared by Leslie Cartwright seven years ago and published in *The Focal Spot*.[7]

This discussion does not lend itself to a detailed description of each of the 74 schools in the provinces that answered the questionnaire; however, the most pertinent and significant data are listed in Table 2. In some instances individual training programmes are cited in order to illustrate the type of training available in a particular area.

British Columbia

In 1949, when the British Columbia Society was in existence for only six years, Mr. M. Smith endeavoured to establish a centralized training course,[7] but his plans did not materialize. According to the secretary of the British Columbia Society of X-Ray Technicians, at the present time six hospitals in this province are engaged in training x-ray technicians.[46] One of these hospitals gives an intensive theoretical course which covers a three-month period. All of the subjects recommended by the Canadian Society of Radiological Technicians in the *Instructors' Curriculum* are taught. After this instructional period the students are engaged in practical work in hospitals and private offices. A salary of $75 at the beginning of the apprenticeship is usually paid, with an increase every six months. At the end of the two year period, the student is qualified to apply for national registration.[47]

The British Columbia Cancer Institute gives a course, established in 1946, with emphasis on therapy. Educational prerequisites include certification as a registered nurse, junior matriculation with one year of physics. In addition to the Director and three other radiologists, the faculty of this institute includes a registered technician who has a degree in public health nursing and three physicists. The school is affiliated with, but not an integral part of the University of British Columbia.[45]

Alberta

In 1949, Calgary and Edmonton were reported as conducting courses in radiologic technology, using the apprenticeship method. After the first year of training the students usually received a salary.[7] The apprenticeship method of 1949, however, has been superseded by organized theoretical training as outlined in 1956 by Mallett:

> Our Provincial Society has an Educational Committee to supervise and advise re technician training. In addition the Edmonton Society has an Educational Committee consisting of several graduate technicians from the various hospitals and offices and a representative of the first and second year students . . . This committee draws up a schedule each summer for the ensuing fall and spring terms. This schedule follows the outline in the C.S.R.T. curriculum.
>
> The theoretical subjects are divided into two groups, those such as nursing procedures, darkroom technique, etc., which can be handled in each department to the best advantage and the other subjects

such as anatomy, physics, radiography, therapy which can be covered by one lecturer meeting the whole group (first or second year) at some central place . . . the education committee appoints a member of the graduate staff at each hospital or office to take charge of a subject in that place, such as darkroom.[52]

It is of interest to note that subjects in the second group are taught in some central place where attendance is checked. Junior and senior students attend separate classes; the seniors are given the more advanced procedures and therapy lectures with a review of the junior course. The student representative conveys to the educational committee the reactions of the students and sometimes offers valuable suggestions. Radiologists teach therapy, anatomy and advanced radiography. The same writer stressed the fact that the plan is not "foolproof and depends upon the application of the student together with the enthusiasm of the voluntary unpaid teacher." Attention was called by the informant to the lack of good teaching material, such as skeletons, models and adequate textbooks in the various hospitals.[52]

Saskatchewan

In 1949, a two year course of the apprenticeship type was conducted in Regina through the combined efforts of the Grey Nuns' Hospital and the General Hospital and Medical Clinic. Subjects taught included anatomy, physics, radiographic technique, processing, ethics, asepsis, patient-technician relationships.[7]

According to the secretary of the provincial society, at the present time 10 institutions conduct schools of x-ray technology.[60] All of these schools participate in a plan that was introduced in Saskatchewan one year ago.

In September, 1955, according to Spencer, student x-ray technicians from all of the training schools in Saskatchewan came to the University of Saskatchewan at Saskatoon for a period of three months. The facilities of the hospital, the medical school and the department of physics were used to conduct a course as recommended by the Canadian Society of Radiological Technicians. The faculty of the medical school taught anatomy, with the physics department conducting courses in physics. Instruction in therapy was given by the therapy department of the cancer clinic of the University Hospital while the school of nursing gave the necessary nursing instruction. Photography was taught by the medical school staff. Three senior technicians from University Hospital, Saskatoon City Hospital and St. Paul's Hospital taught positioning and technique. The chief radiologist of the University Hospital gave an orientation course and taught radiographic anatomy. The students returned to their respective hospitals after the three month period to complete the two years of required training.[62]

According to MacDonnell this course is given by the University as a courtesy, "not a part of the University's stated commitments."[61] Richards states that after this three month period when the student returns to the individual hospital "group discussion is carried out from time to time as circumstances permit and constant supervision permits informal direction."[58]

According to Kent, the system "is largely that of an apprenticeship."[51] Spencer also indicates that 30 hours in actual anatomy is not sufficient, while 30 hours in radiographic anatomy is somewhat excessive. He also states that the department of physics recommends that fewer lectures and and more laboratory work be considered.[62]

Manitoba

The Manitoba Society is the oldest society of x-ray technicians in Canada. In 1949, a course at the Winnipeg General Hospital had been in existence for 20 years and students from various parts of the Dominion graduated from this school. At St. Boniface Hospital a course was conducted, with lectures twice weekly and instruction given while the students were on duty in the department.[7]

According to the secretary of the provincial society, there are 11 schools of x-ray technology in Manitoba.[50] Bodle states, however, that organized training courses are in general still lacking and the apprenticeship method is still in common use. Two large hospitals accept a limited number of students annually for a two year training period after which application is made for certification in the Canadian Society of Radiological Technicians. In these institutions, anatomy, theory and radiographic technique, are taught although not necessarily according to the standardized curriculum. Students in special hospitals are required to supplement this training by a three month period of experience in a general hospital. The lack of more standardized education is attributed by Bodle to the fact that hospital authorities and radiologists in general are not convinced of the feasibility or necessity of a more advanced form of training for technicians.[49]

Ontario

The Ontario Society was formed in 1935, six years after the Manitoba Society.[36] At the fifth annual meeting of the Ontario Society it was reported that already an educational curriculum had been prepared and a list of suitable textbooks were available.[32]

In 1949, a two year course in radiography had been established by the Department of Extension, University of Toronto, through the efforts of Dr. A. C. Singleton and Dr. D. T. Burke. Courses in anatomy, physics, English, physiology, pathology and psychology were conducted at the University, while the technical lectures were given by the radiologists and senior technicians in the five hospitals that participated in the program. Students received practical experience in the different departments. University examinations were conducted at the end of the first year and at the termination of the two year period a final examination was written.[7] This course, however, was discontinued about two years ago.[63]

According to the secretary of the Ontario Society, at the present time there are forty-eight centres of training for students in this province.[55] The Toronto General Hospital gives a one year course in x-ray technology with some of the students continuing an additional year of practical work in this hospital while the remainder of the students "find positions elsewhere." Plans to establish a two year school, howeevr, are now under consideration.[64]

At Sunnybrook Hospital in Toronto, a program is conducted which admits four to six students each year. Information received from Mary Cameron states that, Dr. Burke " . . . has worked out a tremendously efficient system of teaching" in this school.[56].

Of the forty-eight institutions contacted in Ontario, twenty-eight responded. Detailed information on these courses is given in Table 2.

Quebec

The Quebec Society of x-ray technicians, formed in 1940, conducts activities in both French and English. Sister deEllis brings out the fact that bi-lingual nature of this Society has been no obstacle to its progress.[8] On the contrary, this distinctive feature of the Quebec Society enhances its cultural and profesional character.

A course has been conducted for many vears at the Royal Victoria Hospital in Montreal under the direction of Dr. C. Pierce. In addition to the educational requirements established bv the Canadian Society of Radiological Technicians, students with some business experience or college education in the sciences are preferred.

For the past twenty-five years Dr. J. W. MacKay has directed a course in x-ray technology at the Montreal General Hospital.[7] This school has continued to make significant contributions to the education of x-ray technicians throughout the years.

The writer was not successful in obtaining a complete list of the schools of x-ray technology in Quebec, although an incomplete list was obtained from the secretary of the Province of Quebec Society of X-Ray Technicians.[57]

At the present time, the Associated Hospitals of Montreal School of Radiography report a two year course under the direction of Dr. E. M. Crawford. The participating hospitals inculde the Jewish General Hospital; Montreal Children's Hospital; Queen Elizabeth Hospital of Montreal; Reddy Memorial Hospital; and St. Mary's Hospital. According to Crawford, the radiologists associated with the school take an active part in the program by being responsible for the practical instruction in each participating hospital and by giving lectures "assigned by the Director on mutual agreement." Students remain in the hospital to which they have been assigned for one year and in the second year they have a roattion scheme which includes the other participating hospitals.[44]

A two year course, inaugurated in 1948, is given at the Radium Institute of Montreal under the direction of Dr. O. Dufresne. Twenty to thirty students are enrolled in this course each year.

To be concluded in next issue

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tions and best wishes are extended to both Mrs. K. Stub (formerly Miss Laverne Smith) and also Mrs. J. Hayes (formerly Miss C. Quinn) of the staff of St. Joseph's Hospital, Port Arthur, who were both married during the vacation perid.

—R. E. GORE, R.T.,
The Focal Spot Representative.

WESTERN SECTION

On September 25th at the Ontario Hospital, St. Thomas, the Western Section opened the current season of monthly meetings on a splendid new high note.

Immediately following a most cordial welcome by Dr. C. A. Cleland, Superintendent of the hospital, this well-balanced meeting opened with a few introductory remarks by Mr. Reinhold Riese, R.T., regarding the coloured movie, with sound, "Modern Concepts of Epilepsy."

After the showing of the film, a fascinating teaching instrument, there was a short discussion period during which Mr. Riese, who is now a psychology student, having spent these past summer months training at this same hospital, answered questions about the various forms of epilepsy, how they are manifest and some forms of treatment.

The other side of the balanced programme came next with a presentation by Mr. Stewart Olheiser, R.T., of one of the most necessary topics in our field—"Choosing Technical Factors in Radiography." None could have wished for a more logical, step-by-step approach to the considerations of types of equipment, output, calibration and rating, focal-film distances, grids, cassettes, screens, films, types of timers and tubes. The group present were shown the spinning top and its resultant image on film, the aluminum wedge and its image for calibration as well as an actual stationary anode and a rotating anode, all complete with lucid explanations as to use and capacity.

In order to initiate a lively discussion, a cross-section of ideas as to a given set of factors which might be used to produce a radiograph was obtained from five of the members present. These were set up and compared with one another noting and considering the different types of equipment familiar to each of the five members. The result was a very healthy and lively debate, the sort of discussion to answer the purpose of any meeting of radiographers.

We heard next from Mr. Art King, R.T., the highlights of the recent executive meeting in Hamilton which included Dr. Petrie's recommendation, as recorded, that therapy students be required to write an examination paper on Diagnostic Radiography and that radiography students be required to write a paper on therapy.

We learned also of the current move to re-open teaching facilities at McMaster University in Hamilton with a view to producing more senior teaching technicians throughout the province.

Barbara Bolton, R.T., appealed to the members to return the ballots indicating approval or disapproval of the Proposed Scale of Wages and Working Conditions. Apparently, there are many more yet to be returned.

Acknowledgements and thanks to Tony Dennis, technician at O.H., St. Thomas, who worked very hard to prepare this meeting, complete with a delicious lunch, photos of the group and a tour of his department.

The Western Section proposes to activate a Programme Committee in a positive effort to plan, as soon as possible, in advance, programmes for the whole season. As soon as this information becomes available, we would like to publish it so that the hospitals concerned may have ample time to prepare their programmes with or without the assistance of the executive committee, as they so desire.

Our second meeting, held Oct. 25th, at Westminster Hospital, came off very well indeed.

Following the reading of the minutes of the previous meeting by our Secretary, Adeline Escaf, a letter was read announcing a physics course which is being given by the Physics Division of the Ontario Cancer Foundation London Clinic. The letter was written by Dr. Ivan H. Smith and was accompanied by a resumé of the course which began Wednesday, October 16th, at the Cancer Clinic, under the supervision of Dr. John C. F. MacDonald. Some of our Student Technicians have already attended the first two lectures and declared last night that this certainly covers the requirements for technician training in either Diagnosis or Therapy.

In the same vein, Mr. Art King reminded the meeting of the Physics Course which will begin next January at McMaster University, reading off the whole schedule of lectures and the names of the very well known and capable teachers who will be giving the lectures.

The details of enrolment for each of the above courses were given—the former "without fee" and the latter attainable by purchasing a book of tickets for the series.

We were most fortunate in being able to show the Eastman Kodak film, "The Second International Convention," which proved highly interesting, particularly so because of the fact that every Western Section member who attended the Convention appeared in the film and were present at our meeting to enjoy it. For those who were unable to go to Washington, this film certainly helped to fill the void created by their lack of fortune.

The paper entitled "Arthrography of the Knee Joint With Film Magnification"—prepared by Larry Douglas and Morrison McCrady of the X-Ray Staff, Westminster Hospital, both Student Technicians—was presented with the assurance and clarity of a veteran speaker by Mr. McCrady.

With the aid of slides depicting topographical views of the internal structures of the knee joint and corresponding radiographs resultant from the various degrees of rotation in positioning of the knee with forced inversion and eversion, "Morris" took us through the routine Pneumoarthrographic studies of the knee, as performed at Westminster Hospital. Then, the conventional films were displayed side-by-side with films produced by the magnification process (24" distance from a very small focal spot to table-top and 24" from table-top to film placed beneath the table). The results were dramtically clear.

This very good paper was climaxed with an immediate visit to the X-Ray Department where a practical demonstration of the previously-described process was given.

Expressions of thanks to our genial host, Mr. Ralph Silverthorne, and to Mr. John Peco, Mr. Larry Douglas and Mr. Morrison McCrady who all contributed to a pleasant and profitable evening which, of course, was topped off with a delicious lunch and some GOOD coffee.

—THOMAS J. PATRY, R.T., Chairman,
Western Section, O.S.R.

EASTERN SECTION
(KINGSTON BRANCH)

The evening of Wednesday, Oct. 16th, 1957, was the first of many prospective meetings of the newly split section of the Eastern Ontario group. Guests from as far east as Brockville and as far west as Trenton, joined with a splendid representation from Kingston General Hospital, Hotel Dieu Hospital, Kingston Cancer Clinic, Kingston Military Hospital, Drs. Jones, Burr and Colwell office, Kingston, and Belleville members when they met in the new board room of the Belleville General Hospital. The setting of panelled walls, crystal lights, mahogany table, and red leather chairs all added to the comfort and success of the meeting.

Mr. George Williams, R.T., newly appointed Chairman for the Eastern Section, welcomed his guests. He emphasized that, with the excellent attendance at this evening, he was quite certain that with a group of 31 members to start off the first meeting of the season, a successful year was indicated for our Society. He stated although attendance was a primary factor for a successful meeting, participation was also necessary to carry on an interesting and active programme.

The minutes of the previous meeting held last May 4th, 1957, at the Jean Manse Residence, Hotel Dieu Hospital, were read by the secretary. The financial statement was read and passed as correct.

Through previous correspondence with the Provincial Executive it had been decided to split the Eastern Ontario Section and make Brockville our dividing line on the east and Trenton on the west. Congratulations go to Brockville members, three in number, who travelled 104 miles and return to attend an evening meeting. It is hoped they will keep up the good work.

The system in the past of raising funds to cover the cost of secretarial expense such as paper, envelopes, stamps, etc., was explained by Miss M. Bolster with the result a vote was taken and carried that each member would contribute a nominal fee of 25 cents per meeting. The meetings, at the suggestion of Mr. John Flanagan, R.T., would be held every eight weeks, thus giving adequate time for preparation of papers, and also keeping the association active. An evening meeting proved to be more popular than a Saturday afternoon. Therefore, Wednesday evening was put to a vote and carried by majority. The next meeting is to take place on the first or second Wednesday in December. It will be held in Kingston. Notices will be sent at later dates to all members, as the location in Kingston is not known at the present time.

Student members are being encouraged to prepare papers for the coming sessions. It is hoped that they will take a great interest in the meetings and feel certain their participation is wanted.

Mr. Williams, before presenting his paper for the evening, explained that his purpose in doing so at the first meeting was not to steal anyone's corner but to show he did not expect any of the members to do what he himself was reluctant to do. He chose for his subject "Milestones in Radiography" and traced the important steps in

Continued on page 210

LA SOCIETE DES TECHNICIANS EN R.X. DE LA PROVINCE DE QUEBEC

RAPPORT DE LA 2eme CONVENTION INTERNATIONALE DES TECHNICIENS EN RADIOLOGIE

Je décrirai cette Convention en 3 points de vue différents:

Côté hospitalier, côté scientifique, côté social.

HOSPITALIER:

Les Assises de cette importante Assemblée Annuelle furent tenues à l'Hôtel Sheraton Park, un des plus luxueux de la Capitale américaine. La plupart des Conventionistes avait l'avantage d'avoir dans ce même hôtel leur chambre personnelle; ce qui facilitait beaucoup l'assistance aux différentes séances des assemblées. Inutile de dire que toutes les pièces étaient à air climatisé . . . ce qui n'était pas un luxe, surtout durant les derniers jours de la Convention, car nous avons subi là, une température de 90 et 93 degrés . . . c'est vraiment chaud à Washington. L'accommodation pour les repas était facile, car ce magnifique hôtel est enrouré de restaurants "haut ton" et à prix raisonnables.

SCIENTIFIQUE:

Le point de vue le plus important fut sans contredit: le côté scientifique. Ce programme avait été préparé avec grand soin: séances d'études, conférences, discours, etc., etc., et tout fut exécuté avec une exactitude et une ponctualité surprenantes.

Impossible de vous donner quelques détails de tout ce qui s'est dit durant ces 5 jours, car tous ces travaux scientifiques étaient vraiment des pièces de maître, et je craindrais de les amoindrir en essayant de les répéter.

La journée d'études, qui précéda l'ouverture de la Convention c.a.d. le samedi, 8 juin, fut une véritable journée de travail scientifique et c'est avec raison que les Américains la nomme "Workshop Day." Durant ce jour, il y eut surtout des forums où chacun posait ses problèmes à résoudre, ses difficultés à vaincre . . . voire même ses ambitions, pour le bien de la Société, à atteindre. Un comité, formé de professeurs émérites, répondait à toutes les questions. J'oserais dire que ce jour fut un des plus riches d'informations scientifiques et éducationnelles. 800 membres ont pris une part active à cette journée du 8 juin dernier.

Le thème principal de toutes les Assemblées et de toutes les délibérations fut l'éducation des techniciens en Radiologie, par conséquent, des écoles de techniciens. Aucune résolution n'a encore été prise mais un Comité s'occupe activement de la chose, et nous verrons peut-être dès cette année, des personnes autorisées venir faire une inspection des écoles et des hôpitaux, qui ont des élèves sous leurs soins. Un curriculum est à l'étude et nous espérons le recevoir cette année. Comme vous le voyez on s'occupe beaucoup de la formation des futurs techniciens en Radiologie. Il n'a pas été beaucoup question de la séparation des techniciens en Radiologie et des techniciens en thérapie, on en avait tellement parlé l'an dernier, et puis chez nos voisins, aux E.U. cette séparation n'existant pas encore, il n'était pas de mise de soulever ce problème. Seul le Comité des Qualifications a travaillé à ce sujet et ses résolutions nous seront dévoilées plus tard.

SOCIAL

Quant aux activités sociales, elles ont été assez nombreuses et fort bien présentées. Les dîners ou plutôt "Luncheons" au nombre de 4 furent présidés par des personnages de marque, et le banquet de clôture a été d'une splendeur digne de la Capitale Américaine.

Le mercredi, 12 juin, dans l'après-midi, la Compagnie General Electric, toujours si généreuse pour les techniciens, nous gratifia d'une visite de la ville. Quinze autobus transportèrent les Conventionistes à travers les plus belles rues de la Capitale, et puis nous conduisirent au parc Rock Creek où un dîner au poulet rôti fut servi: 1100 boîtes individuelles, contenant tout un repas complet, furent distribuées aux convives. Cette magnifique randonnée se termina en beauté. En effet, au retour, on nous fit descendre sur la terrasse de l'Hôpital militaire de Walter Reed, où la fanfare militaire des E.U. nous fit entendre

un magnifique concert en plein air . . . ce fut superbe . . . Nous n'avons pas eu beaucoup de temps libre pour aller admirer les nombreux monuments historiques de Washington, pourtant j'ai eu le privilège de visiter la Maison Blanche, résidence du Président Eisenhower, ainsi que le Capitole. J'en ai remporté quelques photos que j'ai mises ici, et qui vous donneront une idée des splendeurs de la Capitale Américaine.

Pour terminer, je vous ferai par des quelques résolutions prises à l'issue de ce Congrès.

Il a été résolu:

1. de nommer le Dr. Guillaume Gille membre honoraire à vie.

2. de donner une médaille commémorative au Président National sortant de charge.

3. D'envoyer un représentant de la C.S.R.T. aux Assemblées annuelles Américaines, et les E.U. feront de même. Ces représentants devront faire partie des deux Associations.

4. d'augmenter le taux des cotisations annuelles de $3.00 qui devront être réparties comme suit:

$1.00 pour le Fond général de la Société.

$1.00 pour les Conventions Annuelles.

$1.00 pour les dépenses de la Société.

5. d'augmenter le taux des examens à $15.00. Les reprises complètent seront aussi de $15.00—2 reprises $10.00 et une reprise $5.00.

6. Les Constitution françaises sont actuellement soumises à la législature et seront bientôt imprimées.

7. La Convention Annuelle Nationale aura lieu à Winnipeg en 1958, en Ontario en 1959, et la 3éme convention Internationale à Montréal en 1961.

8. Les élections nationales ont donné comme résultat:

Président: Mr. William Doern de Winnipeg.

Vice-Président: Mr. Henry Heaton de Shaunavon, Sask.

Secrétaire: Trésorière: Mrs. Hood.

28 sept. 1957

Assemblée générale tenue à l'hôpital de Maisonneuve sous la présidence de Sr Ste-Bérénice S.M.

Soeur Tourigny supre de l'hôpital nous souhaite la plus cordiale bienvenue.

Après la lecture des minutes, la présidente nous donna un abrégé de son voyage à Washington comme déléguée à la 2e convention Internationale. M. Archie Wilkinson le résuma en anglais.

Du 29 sept. au 4 oct. se tenait à l'hôpital Général d'Ottawa des cours de R.X. donnés gracieusement par la Cie Général Electric. 55 religieuses suivirent ces cours très intéressants et surtout explicatifs.

Sincères remerciements à nos savants profeseurs J. Morgan & R. Migneault.

Durant notre séjour à Ottawa la Cie a eu l'amabilité de nous faire visiter les principaux édifices du parlement. Sincères remerciements. Toutes s'en retournérent enchantées de leur visite à Ottawa.

Il a été décidé qu'il y aurait une graduation par année et que la société donnerait les épingles aux élus du jour.

Mme L. Wood annonce que toutes les techniciennes en thérapie qui ont 5 ans d'expérience peuvent avoir leur certificat sans examen en faisant la demande dès cette année 1957, car à l'avenir le cours sera de 3 ans: 2 ans en diagnostic et 1 an en thérapie.

Un succulent goûter termine l'assemblée avec la visite du département R.X.

MARIAGES

Mlle Andrée Jutras du Royal V. à M. Bruce Lacasse.

Mlle Lucille Renaud de l'hôpital Ste-Jeanne d'Arc à M.P. Garceau.

Mlle Lise Picard du même hôpital à M. Gilles Béland.

Mlle Colette Sauvageau de l'hôpital St-Joseph de Lachine à M. Alfred Davidson. Nous leurs souhaitons beaucoup de bonheur.

—SR. MARIE DE LA STE-FAMILLE,
I.L. R.X.
F.C.S.P.

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GENERAL ELECTRIC

QUEBEC SOCIETY OF X-RAY TECHNICIANS

The first regular meeting of the Quebec Society of X-Ray Technicians for the year 1957-58 was held on Saturday, September 28th, 1957, at the Maisonneuve Hospital. Sister Ste. Berenice, President of the Society, acted as Chairman of the meeting. The group was welcomed to the hospital by Sister Superior and her words of welcome were tangibly supported by the excellent facilities and delicious refreshments provided for the meeting.

Sister Ste. Berenice gave her report on the Second International Convention and a resumé in English was given by Mr. Wilkinson. The items in the report covering the increase in fees for registered members, the increase in fees for examinations and the granting of registry membership to therapy technicians with five or more years' experience, without examination, created considerable discussion and some rather explosive opposition, particularly with respect to the last-mentioned item.

The business meeting was followed by a discussion of film techniques led by Mr. Donald Fisk. Mr. Fisk instituted a new idea to expedite the bilingual aspect of our meetings and it is hoped that we may be able to expand on the idea so that all members may be included. It follows the United Nations idea whereby a bilingual member translates the discussion into the other language and the members may choose the language they desire to hear by the use of the individual receivers which may be plugged into one of two wires.

The meeting concluded with refreshments after which members were able to visit the modern x-ray department in the hospital.

Sincere sympathy is extended to Miss Rosemary O'Hagan, on the sudden death of her brother, Rev. Father J. J. O'Hagan.

Miss Andree Jutras was married to Mr. Bruce Lacasse recently. Congratulations and best wishes to the happy couple.

—EDWINA BOA, R.N., R.T.,
Focal Spot Representative.

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the development of x-ray generators and such devices as the Potter Bucky diaphragm, the hot cathode tube valve rectification, shock proofing, etc., and pointed out that advances in other fields, such as the invention of the Fleming valve for telegraphy, the science of metalurgy and the field of nuclear physics, played a part in improvements in x-ray generation and its application.

At the close of the meeting the guests were invited to tour the X-Ray Department of the Belleville General Hospital. Then they proceeded to the cafeteria to enjoy coffee and doughnuts which were kindly provided by the hospital.

Later the crowd dispersed for points homeward and agreed the evening was a progressive and successful start for the coming year.

—MARY KINGSBURY, R.T.,
Sectional Secretary.

SASKATCHEWAN DIVISION C.S.R.T.

REGINA SECTION

The first Fall meeting of the Regina Branch was held in the Medical Arts Clinic on Thursday, October 17th, 1957.

Following reports from the retiring President an election of officers for the coming year took place. Elected were:

President — Mr. Dave Silversides, Regina General.

Vice-President—Mr. Glenn Lowe, Regina General.

Secretary-Treasurer—Miss Shirley Anderson, Regina Grey Nuns.

Following the business session an excellent lunch was served by the x-ray staff of the Clinic.

All roads lead to Saskatoon on November 16th, for the annual convention. By popular demand the date of this annual gathering has been changed from the Victoria Day holiday in May, to a Saturday in November. Rather than wait a year and a half, that is, until November, 1958, for another convention, the membership decided to have a general meeting this Fall in the form of a full scale convention. Hence the above date.

It is hoped that the change from a Monday to a Saturday may bring a lot of technicians to the convention who were otherwise unable to attend due to travelling problems.

—D. L. SILVERSIDES, R.T.,
Focal Spot Representative.

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